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A Proposed Program for the Use of Instrumental Music with Orthopedically Handicapped Children

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A PROPOSED PROGRAM FOR THE USE OF INSTRUMENTAL MUSIC
WITH ORTHOPEDICALLY HANDICAPPED CHILDREN

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Donald Henry Allgaier
March 1963

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

In reviewing the literature concerned with music therapy, little account of instrumental music as functional therapy has been found. The organization of this type of program could prove to be an effective aid in the occupational therapy and rehabilitation of the orthopedically handicapped child. Such a program must identify the extent of musical activity and possible opportunities for developing musical activities in orthopedic hospitals. It must also present detailed information of the departmental organization and activities in the various orthopedic hospitals and include attitudes of the medical and allied professions toward music as a therapeutic aid. With this information it may be possible to devise a program not only adaptable in orthopedic hospitals but also of assistance to music educators and therapists working with children in special education schools for the handicapped and perhaps with orthopedically handicapped students in the public schools.

I. THE PROBLEM

Statement of the problem. The purposes of this study are (1) to investigate the historical foundations of occupational and musical therapy and their contribution to conditions existing in orthopedic hospitals throughout the United States;

(2) to determine the value and extent of instrumental music in occupational therapy in orthopedic hospitals in states other than Washington; and (3) to establish a workable program for the use of instrumental music as functional therapy.

Importance of the study. There is a healthy and fairly widespread interest in the possible therapeutic use of music. The American Medical Association, according to a recent issue of its Journal, acknowledges music as a bona fide tranquilizer (3:62). Physicians also agree that the use of functional music has had specific therapeutic value for individual patients undergoing its treatment. Many hospital administrators are aware that music activities have a therapeutic effect, although few have placed any emphasis on it. Directed music activities are carried on only as part of the educational program. The addition of instrumental music to a program of functional therapy can assist in establishing effectively consistent programs of music therapy.

Scope of the study. The purposes of the program will be (1) to offer diversional activity while the child is undergoing medical treatment, (2) to offer concentrated activity for the rehabilitation of joint injury, muscle injury and co-ordination, (3) to overcome fears and develop confidence through performance, and (4) to encourage normal development in spite of physical handicap.

A survey of the orthopedic hospitals in other states has been carried out by questionnaire, and a letter explaining the study was sent to each administrator of these hospitals.

II. DEFINITIONS OF TERMS USED

Orthopedically handicapped. The crippled child in the orthopedic sense is a child with a defect which causes a deformity or an interference with normal function of the bones, muscles, or joints. His condition may be congenital, that is existing at or before birth, or it may be due to disease or accident (38:119).

Functional therapy. Sometimes called kinetic therapy, this is used to increase three functions: muscle power, joint mobility, and co-ordination of movements.

Occupational therapy. This is any activity, physical or mental, medically prescribed and professionally guided to aid a patient in recovery from disease or injury (35:10).

Musical therapy. The process or treatment of a disease, either physically or mentally, by using music either passively by listening or actively by playing or singing.

Therapeutic. The science of healing disease or injury by various methods and remedies.

Rehabilitation. The restoration of the handicapped to the fullest physical, mental, social, vocational and economic usefulness of which they are capable (33:267).

Therapy. The treatment of disease or injury.

Muscle injury. Where the nerve supply is intact but the muscles are weak, undeveloped or restricted.

Joint injury. The joints' normal movements are limited through disease, or after fractures, splints, casts, and operations.

CHAPTER II

HISTORY AND DEVELOPMENT OF OCCUPATIONAL THERAPY

For hundreds of years it has been recognized that doing something pleasant and constructive can be beneficial to many types of patients. A profession has developed based on the principle that properly prescribed and scientifically selected work and play can be of definite value physically, mentally, emotionally, and vocationally.

I. OCCUPATIONAL THERAPY PRIOR TO THE TWENTIETH CENTURY

Ancient writings found in Egyptian tombs tell of games and music used to assist in the recovery of mental patients. The Greeks also used games for both physical and mental improvement. "The Olympics," among the earliest games used for physical development, according to most records date back to the year 776 B. C. Archeologists and historians, however, have discovered that the games or festivals¹ originated sometime between 1253 B. C. and 884 B. C.

¹The ancient Olympics in Greece were a national festival, partly religious in character and deemed sacred to the God of Zeus.

An ancient Greek legend states:

Lycurgus, the great Spartan formulator of law, joined with Iphitus of Elis on the alleged bidding of the oracle to restore the festival in 820 B. C. (11:2).

This indicates that the games had been run before even though they may have begun as religious celebrations.

Mental and physical fitness were an important part of Greek and Roman history. Galen² recognized the value of occupations as educational training and possibly also their therapeutic value when he wrote: "Employment is nature's best physician and essential to human happiness" (35:1).

The organization of hospitals dates to the early Christian era. "From its very beginning, the Christian church dispensed charity and fostered benevolence" (28:427). Along with the development of hospitals, there also arose the use of occupations for the rehabilitation of mental health. Dr. Phillipe Pinel of France appears to have been the pioneer of this movement with his work for the feeble minded. In his Traite, he gives accounts of several patients with whom occupations were used to promote recovery. Dr. Pinel's work excited much interest in other countries, particularly in Germany.

Johann Friedrich Reil, German psychologist, made the following statement:

²Galen, Greek physician and philosopher, whose most important medical work was: Of the Use of the Parts of the Human Body.

Work, moreover is an excellent means besides to cure insanity itself. It must be wholesome and whenever possible be done in the open air and combined with exercise and change (35:2).

As a result of this theory, farming for mental patients was established. The custom of using patients for maintenance labor³ still prevails. It was customary for the patient to spend half his day on maintenance and the other with work of a recreational or diversional nature.

Progress in occupational therapy continued in the nineteenth century as pointed out by the following:

During the nineteenth century occupations for mental patients gradually became better organized and many hospitals had persons in charge who taught various crafts or amused patients by reading or in some other manner (35:3).

Dr. Thomas Story Kirkbride of Philadelphia, frequent contributor to the American Journal of Psychiatry, was "outstanding in his efforts to advance American psychiatry" (35:3). Dr. Kirkbride made the remark that:

It is highly important that patients should, as far as possible, be kept constantly at some pleasant kind of employment. . . either work of some kind or riding, walking or amusement (19:16).

II. GROWTH OF THE PROFESSION

Early in the twentieth century the practice of employing

³The terms labor, employment, moral treatment, recreation, amusement, occupation, exercise, diversion and other words with similar meaning have been used by many writers to describe the form of treatment known today as occupational therapy.

craft teachers to work with patients became quite common in mental hospitals both public and private. The School of Civics and Philanthropy of Chicago offered in its curriculum two important activities: (1) handicraft projects and (2) exercise including supervised games (35:4).

Organization during World War I. In Germany, France, and England much progress was made in rehabilitation of the wounded by means of occupations. Previous to the United States' entry into World War I, a group of interested persons organized the National Society for the Promotion of Occupational Therapy, primarily for the training of therapists.

According to the War Department Bureau of Public Relations:

Occupational therapists in World War I were known as reconstruction aides. Recruited for the most part from the teaching field of arts and crafts, this personnel was given courses of approximately three months to orient them for hospital service. The program was organized in military hospitals of that time under the education officer (35:329).

After World War I, a course in occupational therapy was developed at Walter Reed General Hospital following the established professional standards of the time. Civilian training schools in Boston, Milwaukee, Philadelphia, and St. Louis had, by this time, been organized and accredited by the American Medical Association.

Expansion during World War II. During World War II

most of the work done was in expanding the schools of training. Much of the expansion was done at the request of the Surgeon General of the United States Army. Additional courses were added, completely subsidized by the War Department.

Occupational therapy was organized in Army hospitals under a plan for the rehabilitation of convalescent soldiers. The purpose of the rehabilitation program was to return men to military duty in the highest state of physical and mental fitness in the shortest possible time. Professional standards were established for occupational therapists and, according to the Civil Service Commission (35:331):

Graduation from a course in occupational therapy is accredited by the Council on Medical Education and Hospitals of the American Medical Association, or registration by the American Occupational Therapy Association. The alternate qualification of graduation from an occupational therapy course or registration with the National Association. . . .

One of the outstanding professional achievements of the Army occupational therapy program was the reclassification of personnel. This section was put into effect by the passage of the Starnes-Schrugam Act, Public Law 359, Veterans' Preference Act of 1944. This law provided that (35:339):

No minimum educational requirement will be prescribed in any civil service examination except for such scientific, technical or professional positions, the duties of which the Civil Service Commission decides cannot be performed by a person who does not have such education.

The Office of the Surgeon General made the following recommendations (35:339):

1. That the positions of occupational therapists in the War Department fall within the exception of the above-quoted statute [Public Law 359], and that such occupational therapists should be considered to occupy "scientific, technical or professional positions."

2. That professional qualifications be maintained in order to insure proper instruction, direction and supervision of students of Government training programs of occupational therapy.

3. That the educational qualifications established for occupational therapists were essential to satisfactory performance of duty in the hospital treatment program.

4. That since the Secretary of War has been authorized to prescribe the qualifications of civilians employed by the Medical Department, he was also authorized to maintain the educational qualifications of occupational therapists at the level then established by the Medical Department in its occupational therapy program.

Subsequent to the Japanese surrender, the Surgeon General instituted a policy of reconversion of the Army Medical Department. The plans for reorganization of the Medical Department included the maintenance of occupational therapy in Army hospitals on a permanent peacetime basis and consideration of training, research, and development of new principles, practices, and standardization of procedures.

CHAPTER III

HISTORICAL DEVELOPMENT OF MUSIC THERAPY

I. THE EARLY USES OF MUSIC THERAPY

Music for therapeutic purposes has probably been used for thousands of years. Ancient civilizations associated music with the divine, as can be seen by the reference in scripture (30:281):

And it came to pass when the evil spirit from God was upon Saul, that David took a harp and played with his hand: So Saul was refreshed and was well and the evil spirit departed from him.

The Greek philosophers, Plato and Aristotle, regarded music very highly. Plato, in The Republic, expressed his belief that health in mind and body could be obtained through music (18:Bk.III). The influence of music was prevalent among other Greek scholars. Pythagoras also regarded music as a valuable therapeutic agent in mental and emotional health and recommended that it be used more often (27:4).

Psychiatric cases of various types were treated by song, both among the Greeks and Romans. Celsus⁴ said in regard to the mentally ill: "We must quiet their demonical laughter by reprimands, and soothe their sadness by harmony, the sound of cymbals, and other instruments" (27:5).

⁴Celsus, Aulus Cornelius, Roman writer on medicine who probably lived under the reigns of Augustus and Tiberius (6:177).

For many centuries, people have had different concepts as to the exact nature of disease. Charles Burney, in A General History of Music, states:

. . . philosophers, physicians and anatomists, as well as ancient poets and historians, have believed that music has the power of affecting not only the mind, but also the nervous system, in such a manner as will give relief in certain diseases, and at length, even operate a radical cure (4:159).

Many methods were used by the American Indians to drive out the evil spirits. Frances Densmore⁵ mentions two methods used to cure the sick: "One method involves the private ministrations of a doctor or medicine man and the other a public ceremony conducted by a number of doctors, attended by many people, and often continued for many days" (31:25). The American Indians, called upon the magic of the medicine man, who often held the combined offices of priest, physician, and magician. In this position the medicine man would often dance and chant to the accompaniment of rhythmic instruments. With the exception of the drums, rattle, flute and bells, instruments were practically unknown. Music was primarily associated with "dance with words or with dance and words" (31:3). The medicine men of the Chippewa make use of a special song with these words (31:33):

⁵Densmore, Frances, outstanding authority on the subject of Indian Music and collaborator of the Bureau of American Ethnology of the Smithsonian Institute (15:617).

I am fighting to cure you,

I will suck out what is hurting you, to cure you,

The things I shall take out of you are the things
that are causing your sickness.

Now I shall take Mother bear⁶ and put her under my arm,

As I get ready to look in the crystal, and I will
help you.

Help us all.

Thank you.

The singing of the Indian doctor was entirely monotonous so
that the rhythm was impressed on the mind of his patient.

"The rhythmic pattern holds his attention and in some
instances, may be somewhat hypnotic in effect" (31:36). The
medicine men were consecrated to their work, and the safety,
success, and health of their people depended on their efforts
(21:4).

The Renaissance in art and science developed in Italy
during the fifteenth and sixteenth centuries. Accurate
descriptions of human anatomy finally replaced the old erron-
ous conceptions, and individuals continued to write of new
discoveries. Progress, however, was made rather slowly

⁶"Mother bear" refers to the "bear paws" or "mittens"
the medicine man puts over his hands. They consist of the
skin of the forelegs of a bear, with the paws.

because the populace was reluctant to accept new concepts.

Music and medicine have had numerous associations throughout history. Some that developed during the Renaissance were (31:127):

. . . (1) the therapeutic effects on music on the body and on the mind; (2) special disease phenomena that indirectly relate to music; (3) music and physiology; (4) social phenomena that indirectly relate music and medicine. . .; (5) incidental points of connection between music and medicine or between music and men of medicine; and (6) the direct interest of medical men in music for its own sake.

The great surgeon Pare⁷ writes of the cure of spider bites and mentions sciatica and gout, saying that "music gives ease to pain" (31:129). The psychological power, or the effect of music on the mind, was also discussed by Renaissance writers. "The view of a healthy state of mind supporting a healthy state of body causes with it the problem of mind body relation which very much engaged the philosophers of the era" (31:130).

Disease and its relationship to music can not be discussed without mention of the phenomenon of tarantism. This disease occurred only in the region of Apula in southern Italy and was attributed to the bite or sting of the tarantula. It would cause the person to dance in great excitement and frenzy. "Music and dancing were the only effective remedies, and people were known to have died within an hour or within a few days

⁷Pare, Ambroise, French surgeon whose most important contributions to medicine were improved treatment of gunshot wounds, amputation, and heart surgery.

because music was not available" (31:107). The scientific basis was that the bitten person was not so much suffering from the poison of the tarantula as from the mental effect or neurosis that resulted.

Music and physiology come together in the field of singing and the science of voice production which brought solo singing into prominence. The value of medical knowledge as well as musical knowledge was stressed by many physiologists of the time.

Music also played its part in the immoral aspect of the Renaissance. The stimulation of prostitution through music and dancing was a prominent part of the Renaissance society. This, of course, had its effect on the increase of syphilis and other diseases.

Immoral though they were, the aristocracy cultivated the learning of arts and sciences. A circle which brought musicians and men of medicine together was that of the so-called "academie," meetings of literary, artistic, and scientific men for the learned and musical discussions of dramatic performance (31:137).

Many medical men were interested in music not only for its healing effect, but from an applied standpoint. The use of music as an avocation was very prominent among medical men of this time.

"The seventeenth century was primarily a philosophical

age and all disciplines followed the path of philosophy" (31:142). Robert Burton, English clergyman, author, and philosopher, in his Anatomy of Melancholy, says:

But to leave all declamatory speeches in praise of divine Musick, I will confine myself to my proper subject: beside that excellent power it hath to expel many other diseases, it is a sovereign remedy against Despair and Melancholy and will drive away the Devil himself (5:479).

Since Burton's book, as a whole, deals with abnormal psychology, his reference to music suggests a remedy for a morbid state of mind.

In the eighteenth and nineteenth centuries, a new investigation arose concerning the influence of music upon the human organism. Emphasis was placed upon the knowledge of musical elements, rhythm, harmony, melody, tone color, dynamics, and a full understanding of the ways these affect the listener. It was also encouraged that physiologist, psychologist, and musician collaborate in working with mentally disturbed or physically impaired patients.

An interesting experiment on the influence of music on the heart and blood vessels was carried out by the French doctors Alfred Binet and Phillipe Courtier. These men found that the pulse rate was affected by the type of music played. Lively music acted as a stimulant to the heart and circulation, while soft, sad music acted as a depressant. The following table is a summary of the results (26:51):

TABLE I

ANALYSIS OF THE INFLUENCE
OF MUSIC ON THE HEART AND BLOOD VESSELS

	Action of the pulse	
	Before	After
March from Tannhauser. Wagner	80	84
Soldier's Chorus. Gounod	81	87
Hungarian March. Berlioz	86.5	91.5
Sword Episode from Die Walkure. Wagner	69	70
Ride of the Valkyries. Wagner	68	83
Spring Song. Wagner	69	73.5
The Meeting from Faust. Gounod	68	84
Love Duet from Faust. Gounod	73	83

William Rush Dunton, in Prescribing Occupational Therapy, has the following to say in reference to circulation of the blood:

One of the chief beneficial results of motion of any kind is to increase blood supply. Increased blood flow helps repair fractures, injured muscles and diseased joints. . . therapy not only overcomes functional disabilities but increases the actual healing process (8:10).

The results of nineteenth century experimental and observational methods led medical and musical men to believe that the controlled use of music therapy may be of very desirable value.

II. DEVELOPMENT DURING THE WAR YEARS

The use of music as therapy developed to a great extent during the first World War when many military patients were confined to hospitals for prolonged periods.

It was noted that those who busied themselves with such physical activities as required the use of their

wounded extremities regained the use of these extremities sooner than those who remained idle physically (21:44-45).

Thus was developed a branch of occupational therapy known as functional to differentiate it from previous psychiatric use. The crafts first used in functional work were carry-overs of those most beneficial in mental disease. Previous to World War I, there had been a desire on the part of musicians to give music service to hospitals. This enthusiasm to serve the sick created two related problems with hospital administrators and musicians. How could hospital administrators use musicians to the best advantage and in what way could the musicians be of value to the hospitals (31:294)? Two noteworthy developments materialized: the United States Army Hospital Service adopted a program of reconditioning in Army General Hospitals and the American National Red Cross made music part of its extensive recreational activities in the service hospitals.

Music received much official attention during the first World War. It was encouraged by musicians and was even provided for by tables of organization which assigned men to small units and, until 1942, provided a band for each regiment. "The use of music as a diversion in service hospitals received a great impetus in the First World War but made its greatest leap forward with the introduction of the portable bedside radio" (21:14).

In World War II, music played a definite part in the

Army's Reconditioning Program. Bands were authorized for general hospitals, and music technicians were assigned to regional, as well as general hospitals. In addition to helping the patients, the technicians did a great deal to promote a better interest and understanding between the doctors and the musicians. The extent of this interest is shown by the program of the Surgeon General's Office, established in 1944. (See Appendix A).

Lieutenant Guy V. R. Marriner⁸ states that a six month survey proved there was a place for music in reconditioning to be used educationally and that a well organized music program could be a motivating element in hospital life when integrated with other activities (23:162). Exploratory programs for reconditioning were continued in various hospitals and through combined research and training; these programs were extended to include the Veterans Administration and its hospitals.

III. RECENT DEVELOPMENTS

Today, there is a strong public interest in the field of music therapy. Steps have been taken to prepare more people

⁸Chief of the Hospital Section; Music Branch, Special Services Division, and the Music Liaison Officer between the Special Services Division and Offices of the Surgeon General.

to take part in the program of music therapy at the scientific level. Many colleges and universities are developing well planned training schedules and internship under adequate supervision. In the college curriculum, the music therapy major may encounter such courses as "The Influence of Music on the Human Organism," "The Psychology of Music," "Recreational Music," "Delinquent Behavior," "Mental Hygiene," and "Hospital Orientation" (3:62).

An important step has been taken by the National Association of Music Therapy⁹ in enlisting the cooperation of nationally known doctors and medical persons on an Honorary Advisory Board.

The aims of the National Association of Music Therapy are:

. . . the progressive development of the uses of music in medicine, the advancement of research, the distribution of helpful information, the establishment of high standards of qualification and training for therapists, and the perfecting of techniques of music programming which will aid medical treatment most effectively (24:32).

Increasing attention has been given to problems uncovered by these enthusiasts. Programs have been developed which encourage musical experiences in the scientific practice of music therapy. Described in Table II (33:338) are eight areas of musical experience that are important in a systematic

⁹The National Association for Music Therapy is an organization of doctors, educators, psychologists, and musicians working in rehabilitation activities, with students preparing for the profession and with interest persons.

approach to therapeutic planning.

TABLE II

RATINGS OF MUSICAL ACTIVITY
FOR MENTAL, ORTHOPEDIC, AND MEDICAL PATIENTS¹⁰

Area-present but not ratable	Factors ratable
1. Musical skills	Effectiveness
2. Social skills	Adjustiveness
3. Esthetic enjoyment	Sensitiveness
4. Problem solving technique	Efficiency
5. Physiologic reactivity	Desirability
6. Psychologic reactivity	Desirability
7. Personal viewpoint	Adequateness
8. General integration	Adaptiveness

The modern trends of music therapy are advancing. Music therapists, however, must continue their efforts to interest more physicians and professional workers, they must avail themselves of every educational opportunity to improve their knowledge, and they must pass on to others information concerning the benefits to be derived from music therapy.

¹⁰All ratings are made with reference to music activity only, not to the patients pathological condition.

CHAPTER IV.

FACTORS CONTROLLING SELECTION OF CHILDREN

Many activities generally in use with occupational therapy are not of special value in the treatment of physical injuries because they fail to meet the criteria set up to determine the adaptiveness of an activity for such treatment (35:196). To be adaptable for a specific exercise, the activity must be selected with a complete knowledge of the physical condition of the individual child and knowledge of the child's mental attitude toward the treatment.

Basically the handicapped child wants (1) the highest physical function he can gain; (2) social acceptance as an active participating member of the community; and (3) the fullest realization possible of emotional satisfaction in his personal and social relationships (13:216). This indicates that handicapped children desire to be treated like other children rather than as children with handicaps. Cruickshank¹¹ states that "handicapped children show a real interest in comparing themselves with others in an effort to determine their standing with others" (7:310).

Listed in Table III (22:196,197) are the causes of crippling conditions.

¹¹Cruickshank, William M., Professor of Education and Psychology and Director, Education of Exceptional Children, Syracuse University.

TABLE III
CAUSES OF CRIPPLING CONDITIONS¹²

-
-
1. Crippling due to infection (e.g., bone and joint tuberculosis, osteomyelitis, poliomyelitis, rheumatoid arthritis, syphilis).
 2. Cerebral Palsy (e.g. spasticity, athetosis, ataxia, rigidity, tremors, or variations of these).
 3. Crippling due to birth injury (e.g., Erb's Palsy, bone fractures).
 4. Cardiopathic conditions (e.g., congenital, acquired).
 5. Congenital anomalies (e.g., congenital amputation, congenital dislocation, clubfoot, torticollis, spina bifida, cleft lip and palate).
 6. Traumatic crippling (e.g., amputation, burns, fractures, joint contractures).
 7. Tumors (e.g., bone tumors, bone cysts).
 8. Developmental diseases (e.g., coxa plana, spinal osteochondritis).
 9. Other conditions (e.g., fragile bones, spinal curvature, postural foot conditions, muscular atrophy, muscular dystrophy, rickets).
-
-

¹²For clarity and understanding, the reader should consult the Glossary (Appendix E) for the various joint motions and medical terminology used in the remainder of Chapter IV and in Chapter V.

The success of occupational therapy depends not only upon the occupational therapist's skill but also upon the physician's supervision and guidance.

I. RESULTS DESIRED BY REFERRING PHYSICIAN

Previous to any therapeutic treatment, the factors determining the type and amount of treatment must be considered. Therapy should never be administered without specific information, and should include: (1) the diagnosis, (2) the present condition, (3) the prognosis, (4) the parts of the body to be exercised, and (5) the length and frequency of treatment.

II. PHYSICAL CONDITION OF CHILD

Diagnosis. The diagnosis indicates the condition to be treated and must contain information as to the present state of the injury.

Present status of injury. Specific information must be obtained as in the following conditions¹³:

Fractures. What is the type of fracture (compound, comminuted, etc.)? In what position was the part immobilized? Is there good alignment? Is there bony union? Is the injury near the joint? Is the part still in a cast? If so, is the cast to be removed during treatment? If the injury is to the arm, is the patient using a sling? Is the patient using a support or brace? If the injury is to

¹³Only the most common conditions and those that are subject to treatment by the use of occupational therapy are listed.

a leg and the patient is on crutches, is weight bearing permitted? Is there nerve involvement?

Infections. Is there active infection? Is there an open wound? Is there loss of joint space or ankylosis? Have tendons been destroyed? How much swelling remains? Is the skin tender to touch?

Sutured Tendons. Is the tendon likely to tear if stretched? Are sensory or motor nerves affected?

Burns. Has the burned area healed? Was skin grafting done? Is there danger of tearing the newly healed skin? Are there severe contractures? Is there marked tenderness of the skin?

Arthritis. Is the condition acute or chronic? Is there danger of flare-up of the disease? Are other joints not to be exercised? Is there much pain and swelling? Is there much deformity?

Dislocations. Is there danger of redislocation?

Osteomyelitis. Is there likely to be a flare-up of the infection? Is the wound healed? If so, how long has it been healed?

Amputations. Is the stump healed? Is there danger of breaking the wound open? Is there marked tenderness of the stump? Is it the dominant hand?(35:192).

General health of child. The general physical condition of the child should be discerned. Is the child in good health? What is the character of the child's physique, rugged or delicate? Does the child have any history of cardiac condition? Are there any limitations on the child's activities? Has the child any other disability, such as an allergy or epilepsy?

In addition to these, eyes, ears, nose and throat conditions should be carefully checked. Is the child in need of glasses? Is the child's hearing normal? Have the child's

tonsils been removed?

The degree of limitation of joint motion. Each joint of the injured extremity must be measured and tested. If there is limited motion of another joint, it should be determined whether this is due to the present injury. It is not sufficient to measure the range of motion in only the parts affected.

General rules for measuring joint motion. One person should be responsible for taking the measurements as variations in method will cause difference in degrees of motion obtained. The arthrometer, shown in Figure 1, is the instrument used in the measurement of joint motion. The hinge of the instrument is placed on the joint or in the axis of the joint to be measured. The stationary bar is placed in line with the stationary bone. The movable bar is placed in line with the bone to be moved.

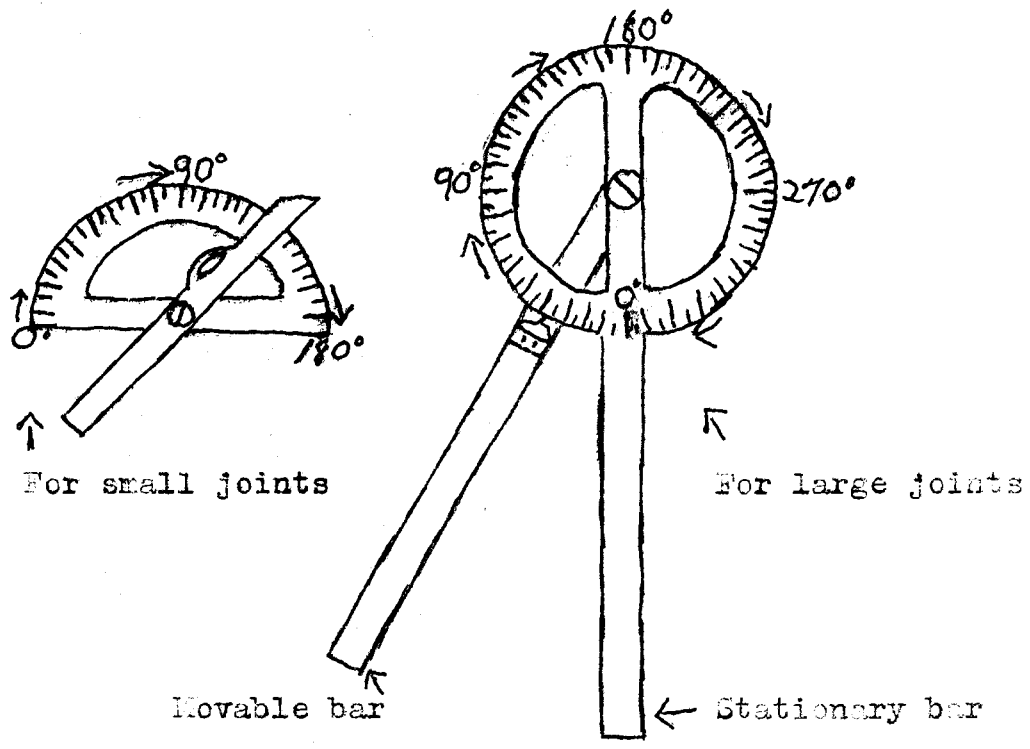


FIGURE 1
ARTHROMETER

The child should put the injured part through the greatest possible range of motion. If it is difficult to hold the instrument in place while the child makes the motion, it may be placed after the motion is made. Comparison should be made with the average normal, that is, with the same motion of the uninjured part. To differentiate between muscle weakness and joint limitation, take the part through the range of motion passively. To do this, the motion is performed by an outside agent and requires no muscular contraction on the part of the patient. Opposed to this is the active range of motion which requires no more strength than is used in making a movement through the complete range of action. If passive range of motion is greater than the active range, there tends to be muscle weakness.

Systems of recording measurement (35:255):

A. Using a Circle (360°).

Anatomic¹⁴ position-- 180° (except when otherwise stated).

Decreases--flexion, abduction, pronation, inward rotation.

Increases--extension, adduction, supination, outward rotation.

B. Using an Arc (180°).

Anatomic position--0.

Increases--motion in any direction.

¹⁴Body erect, face toward observer, palms turned forward toward observer.

Described in Table IV (35:253) are the primary joints concerned with occupational therapy.

TABLE IV
TYPES OF JOINTS WITH WHICH OCCUPATIONAL
THERAPY IS CONCERNED

(Diarthroses or Freely Movable)

A. Uniaxial--or movement around one axis only.

(1) Hinge Joints (Ginglymus).

Motions--flexion and extension.

Example--elbow.

(2) Pivot Joints (Trochoid).

Motion--rotation.

Example--radioulnar articulations in pronation and supination.

B. Biaxial--or movement around two axes.

(1) Condylloid--ovoid surface received into elliptical cavity.

Motions--flexion, extension, abduction, adduction, circumduction.

Example--wrist.

(2) Saddle Joint--correspondingly concavoconvex surfaces much the same as above.

Motions--as above.

Example--carpometacarpal joint of thumb.

C. Polyaxial

Ball and Socket Joints (Enarthroses).

Motions--in all directions.

Example--hip and shoulder.

D. Arthrodia--gliding joints.

Example--carpal bones.

The following directions apply to System A. (circle 360°), using the arthrometer as shown in Figure 1.

Specific directions for measuring each joint (35:255-264):

Hand: Fingers--All Joints--Flexion and Extension.

Position--wrist in slight hyperextension.

Placement--use small instrument, placing it on posterior surface of bones with angle apex directly over joint as in Figure 2.

Support--give support just below joint being measured.

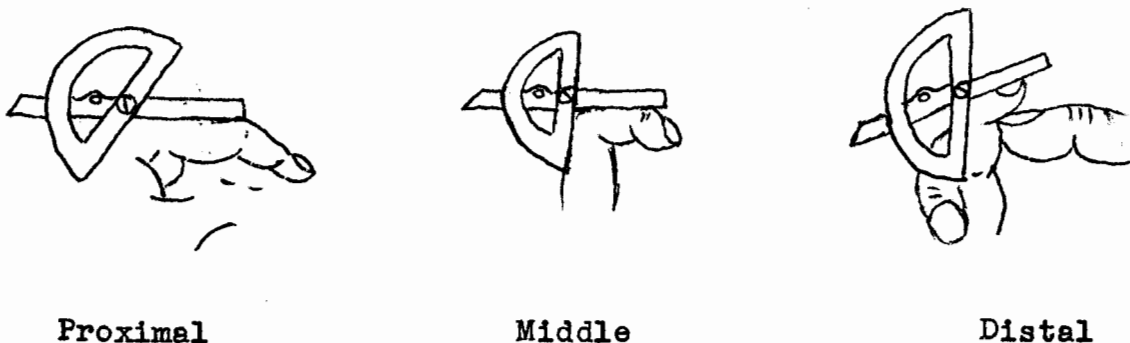


FIGURE 2

MEASUREMENT OF FINGER JOINTS

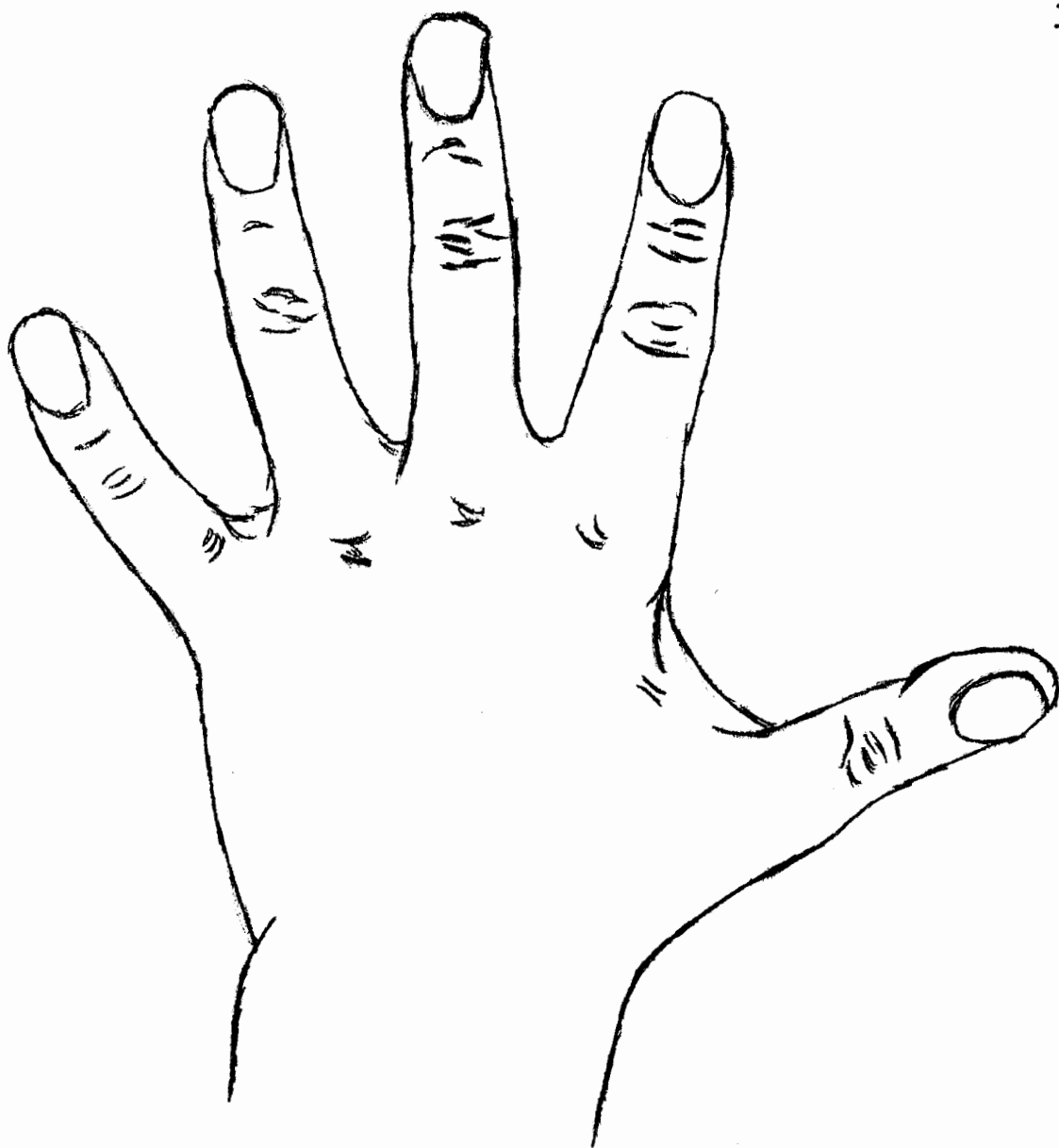


FIGURE 3

ABDUCTION OF FINGERS

Proximal Joints--Abduction and Adduction. Can best be taken for comparison by laying hand flat on paper and drawing outline as in Figure 3.

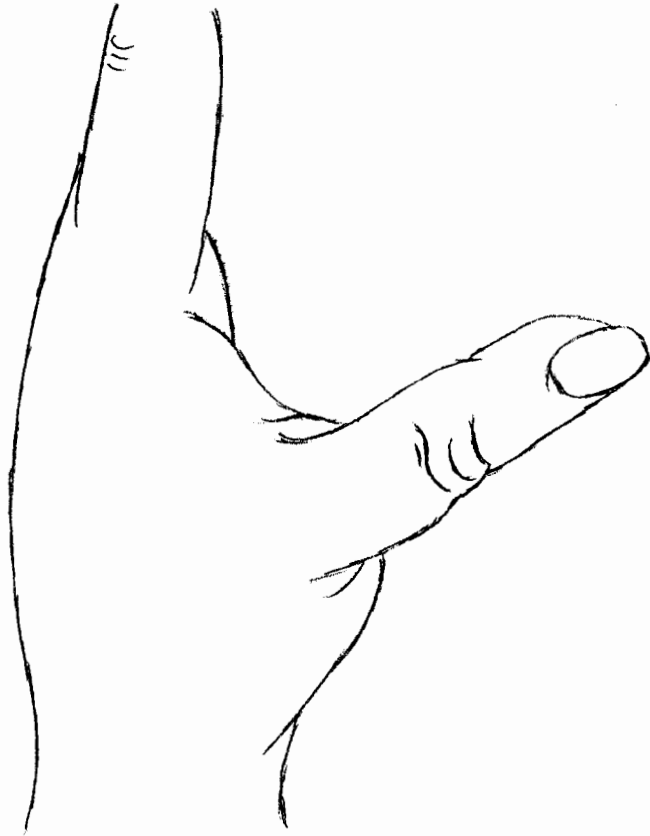


FIGURE 4
THUMB ABDUCTION

Thumb.

Middle and Distal Joints--Flexion and Extension (as for flexion and extension of fingers).

Proximal Joint--Abduction in plane of hand (as for abduction of fingers). Extension or Diagonal Abduction (not measured).

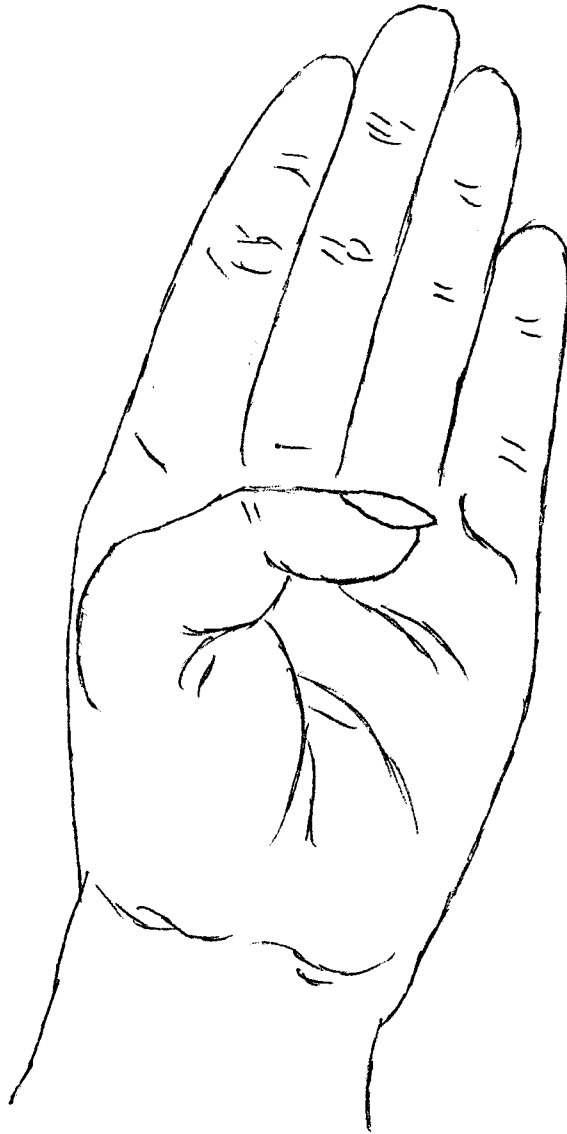


FIGURE 5

THUMB ADDUCTION

Adduction--return from abduction in either direction,
toward base of middle finger (not measured).

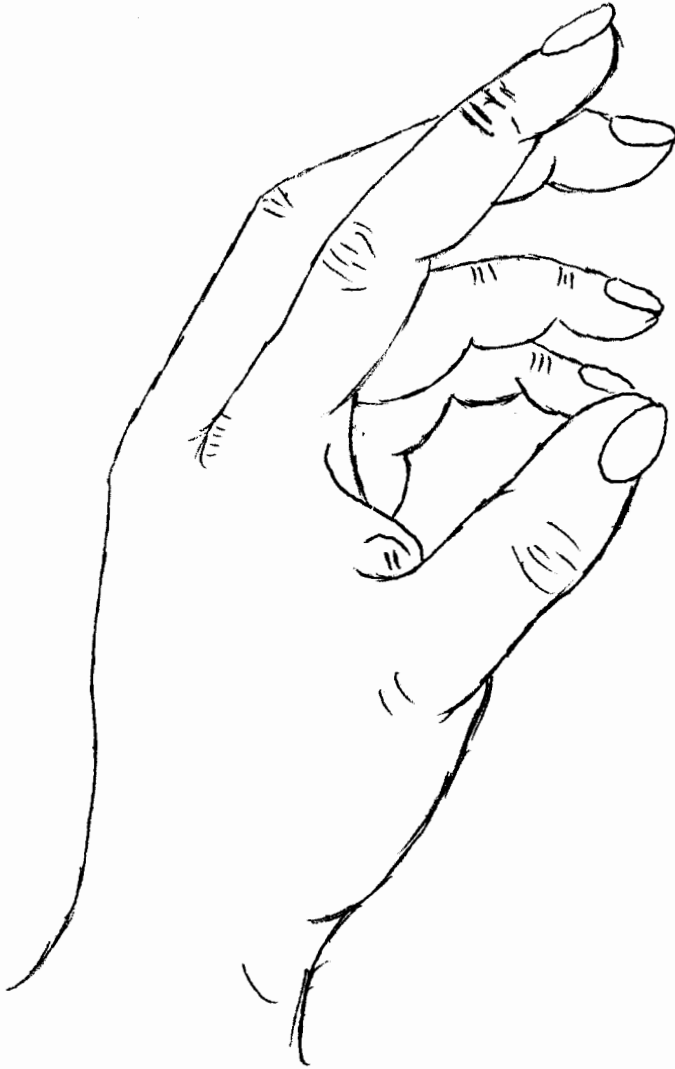


FIGURE 6
OPPOSITION

Opposition--useful function of thumb is judged by its ability to oppose itself to the tips of all fingers without being adducted toward palm (not measured).

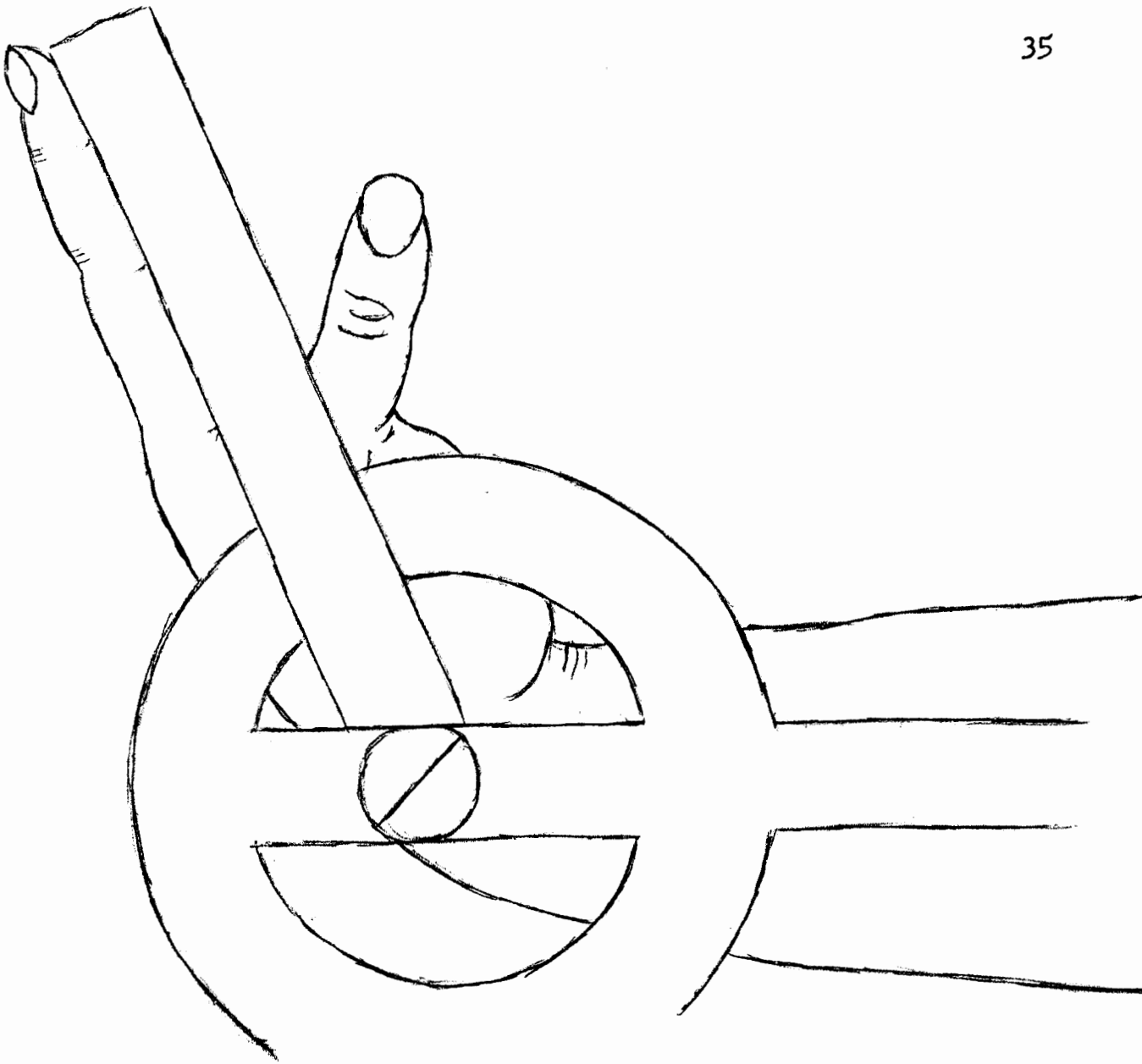


FIGURE 7

WRIST FLEXION

Wrist--Flexion and Extension

Position--hand and forearm resting on table in mid-position. (on 5th finger)

Placement--stationary bar in line with radius. Movable bar in line with 2nd metacarpal.

Precautions--allow fingers to flex in wrist hyperextension. Allow fingers to extend in wrist flexion to prevent restriction by two-joint muscles.

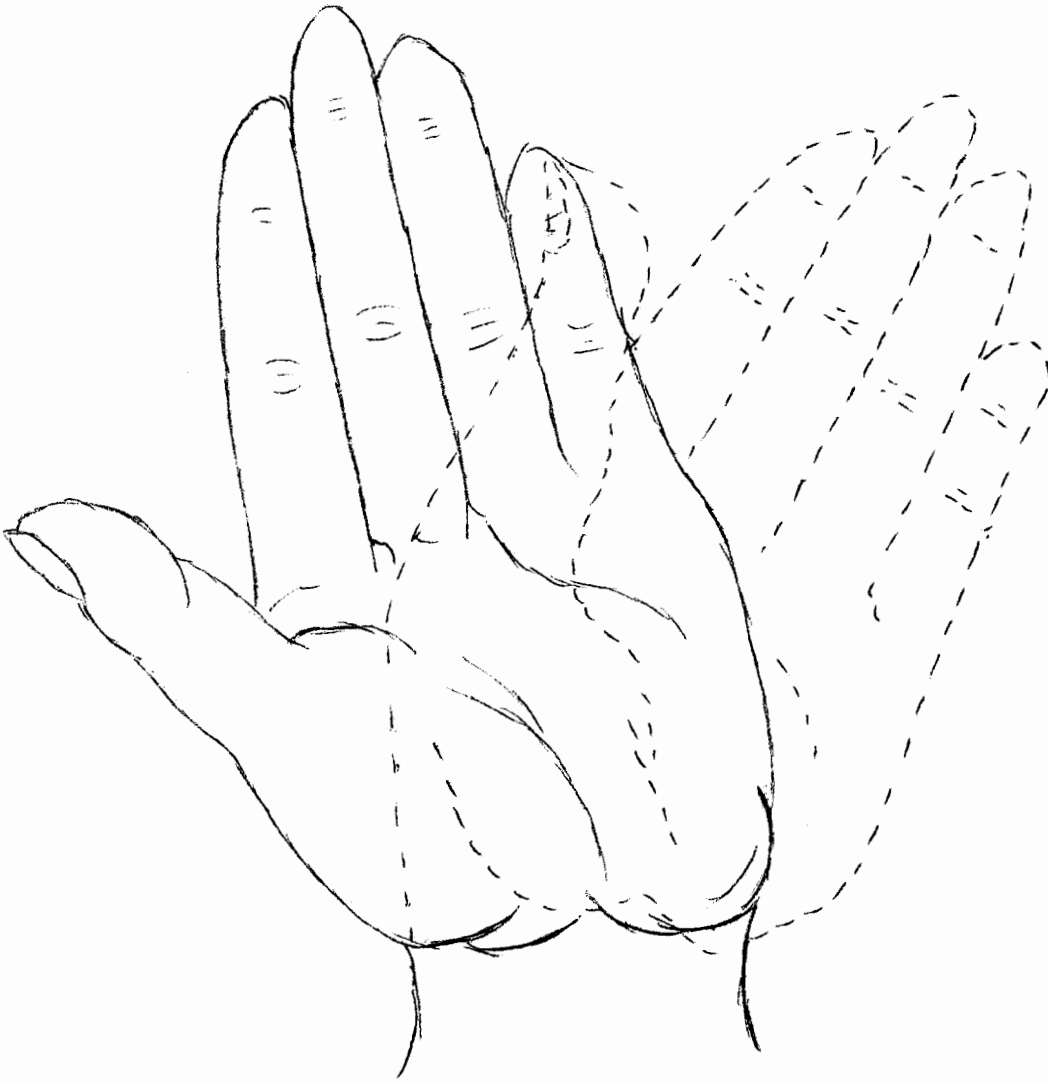


FIGURE 8

WRIST ABDUCTION AND ADDUCTION

Abduction and Adduction

Position--hand and forearm on table in pronation.

Placement--immovable bar in line with mid-line of arm.

Movable bar in line with 3rd metacarpal.

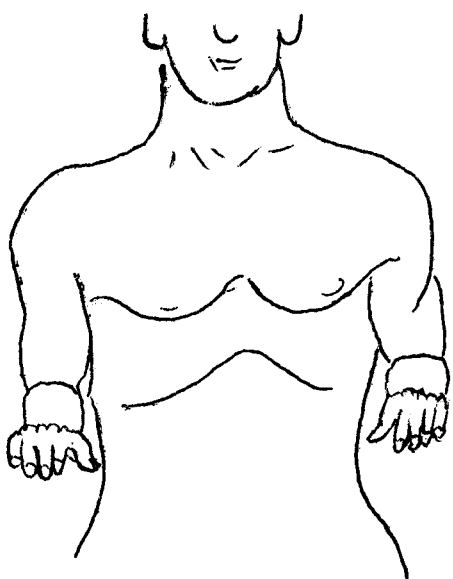


FIGURE 9
PRONATION

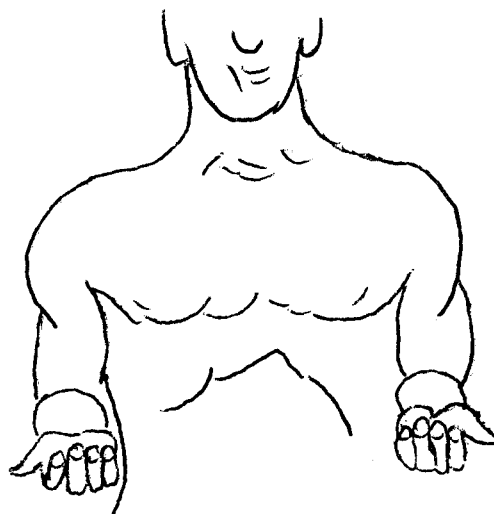


FIGURE 10
SUPINATION

Forearm--Pronation and Supination

Usually done by comparison, testing both arms at once.
Position--arms close to sides (to rule out substitution at shoulder joint); elbows flexed to 90° (to rule out rotation substitution at shoulder point).
Pronation--palm completely down.
Supination--palm completely up.

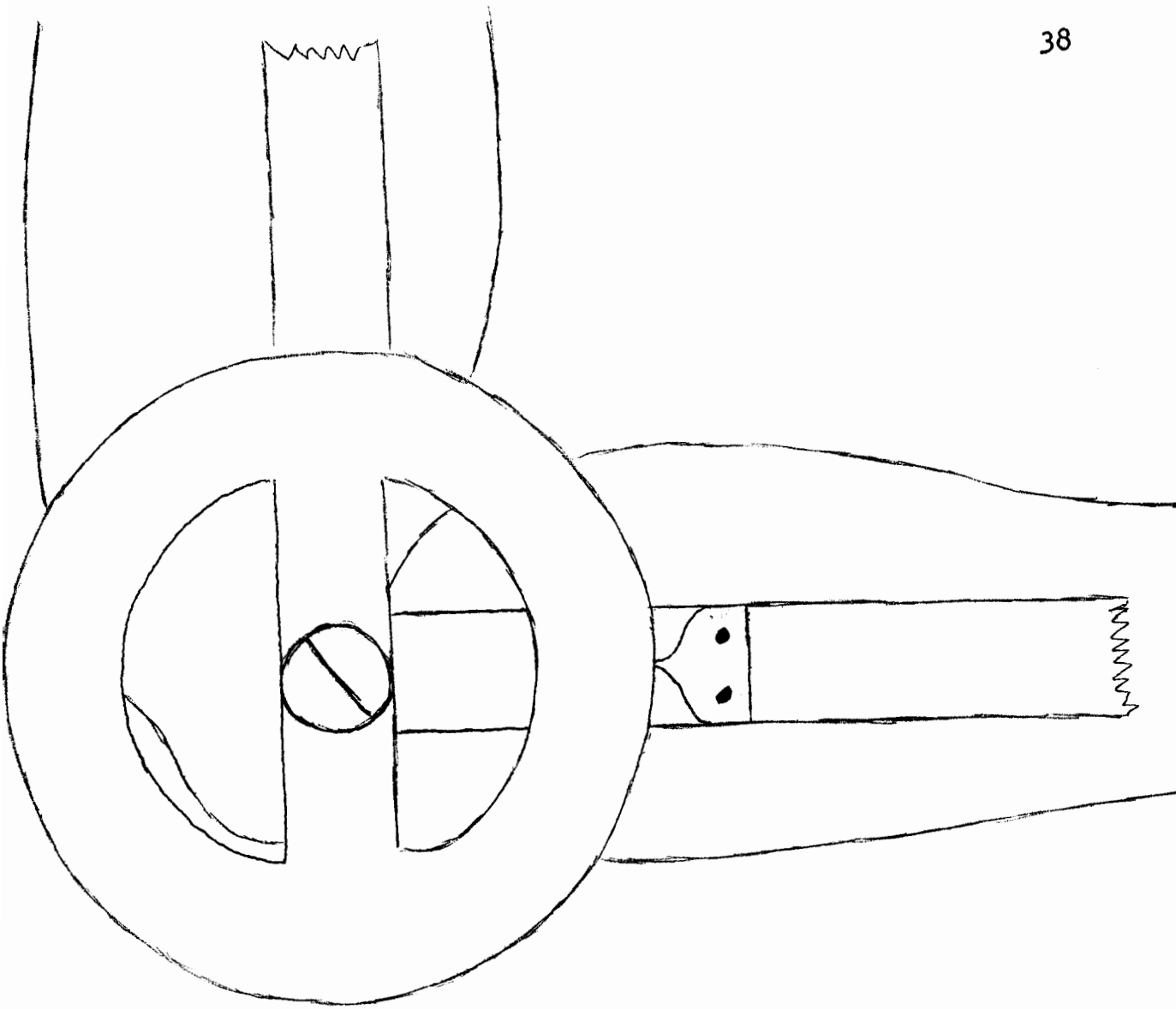


FIGURE 11
ELBOW FLEXION

Elbow--Flexion and Extension

Placement--stationary bar in line with humerus. Hinge on lateral condyle of humerus. Movable bar--(choice of following).

Arm in supination--bar in line with radius.

Arm in pronation--bar in line with ulna.

Arm in mid-position--bar following center of arm.

(Use same position every time.)

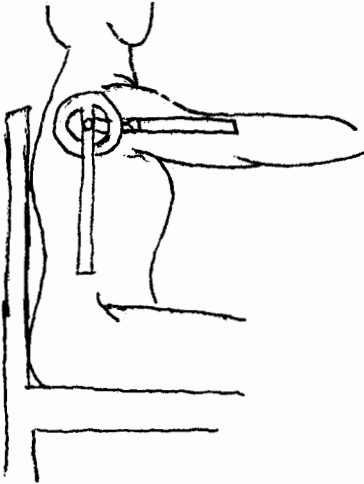


FIGURE 12
SHOULDER FLEXION

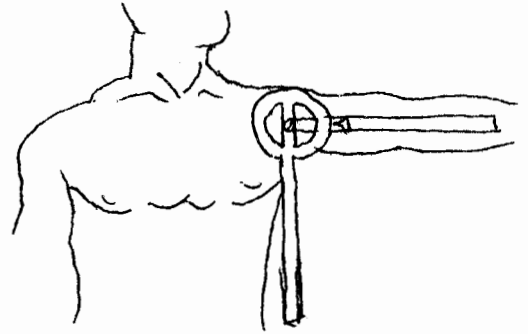


FIGURE 13
LATERAL ABDUCTION

Shoulder--Flexion, Extension, Abduction, Adduction.
Position--have patient sit erect in chair with lumbar spine and shoulder against chair.
Placement--hold stationary bar in line with side of body (perpendicular to floor). Movable bar in line with humerus.
Precautions--in forward flexion--look for arching of back. In hyperextension--look for thrust of shoulder. In abduction--look for sideward body swing.

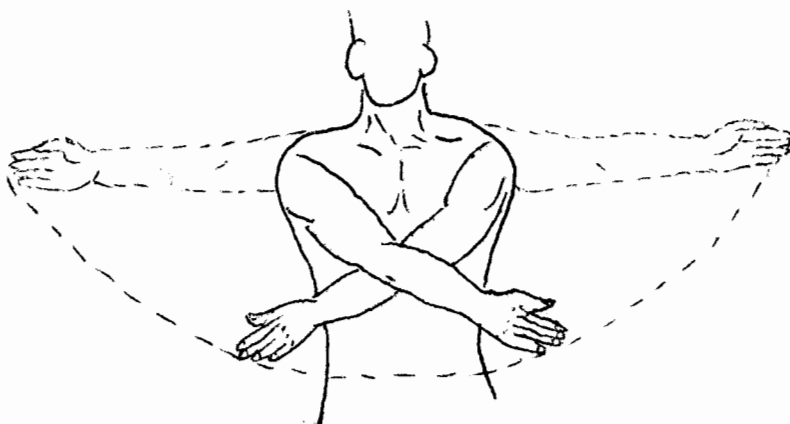


FIGURE 14

HORIZONTAL ABDUCTION AND ADDUCTION

Horizontal Abduction and Retraction.
Horizontal Adduction and Protraction. By comparison
with normal part.

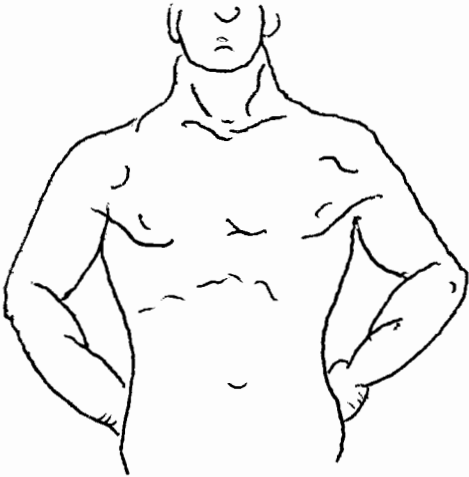


FIGURE 15
INWARD ROTATION

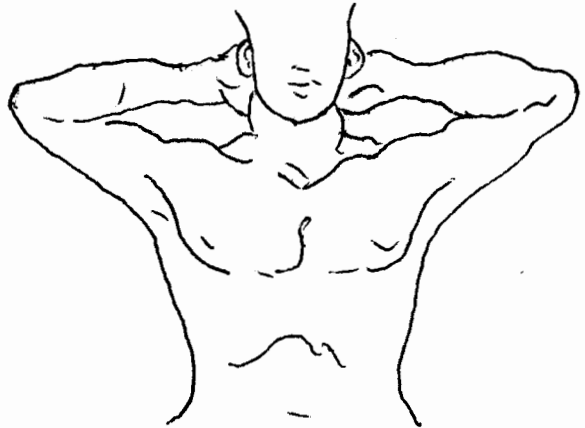


FIGURE 16
OUTWARD ROTATION

Rotation--Inward and Outward.

Usually done by comparison--testing both arms at once.

Position--Inward Rotation--arms behind back as in tying apron strings. Outward Rotation--arms behind neck as in fixing hair. Or--arms at side, elbows flexed to 90°, have patient move hands from front to side.

Precautions--elbows are bent to rule out forearm motion. Both sides are tested together to rule out body substitution.

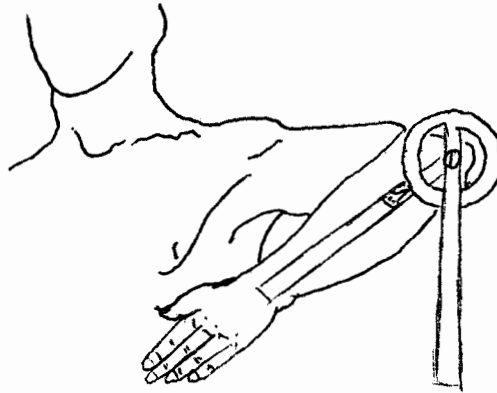


FIGURE 17

MEASUREMENT FOR INWARD AND OUTWARD ROTATION

Possible Method of Measurement.

Position--elbow flexed to 90° . Shoulder abducted to 90° .

Placement--stationary bar hangs down following line of body. Movable bar follows midline of forearm. Hinge at elbow.

Outward Rotation--forearm raised forward and up. Upper arm kept in position. **Inward Rotation**--forearm lowered.

Contained in Table V, are the averages of normal motion for the various joints described.

TABLE V
AVERAGES OF NORMAL MOTION

	<u>Flexion</u>	<u>Extension</u>
Fingers:		
Proximal joint.....	90°	180°
Middle joint.....	70°	180°
Distal joint.....	140°	180°
Thumb:		
Middle joint.....	110°	180°
Distal joint.....	90°	180°
Wrist:		
Flexion.....	100°	
Extension.....	245°	
Abduction.....	155°	
Adduction.....	215°	
Forearm:		
Pronation.....	0°	
Supination.....	180°	
Elbow:		
Flexion.....	40°	
Extension.....	180°	
Shoulder:		
Flexion.....	20°	
Hyperextension.....	220°	
Abduction.....	20°	
Adduction.....	180°	
Inward Rotation....	30°	
Outward Rotation...	190°	

III. ACTION OF THE MUSCLES

All movements of the segments of the body are the result of muscle contraction, muscle tension, and the force of gravity. Contraction is the main source of all movements in which the parts of the body are raised or held in position against gravitational force. Whenever the body or one of its parts is moved upward, contraction must be sufficient to overcome this downward pull of gravity.

Muscle tension around a joint varies according to several factors, including the position of the joint, the tonus of the muscle, the "normal resting length"¹⁵ of the muscle, and the weight or momentum of the particular part or segment of the body.

Every muscle has its two ends attached to different bones. Usually the bones are adjacent with the muscle extending across a single joint. Other muscles are longer and cross two joints. This difference in structure of the muscles results in variations in the tension. The bi-articular muscles, or those which cross two joints, serve a different function than the one-joint muscles. Because of their tension, they tend to keep the two joints in about the same position of flexion or extension. The strength for most movements comes from a combined action of the one and two-joint muscles.

¹⁵When a joint is in its mid-position, all muscles may be nearest a relaxed condition. The length at this time is called the normal length of the muscle or its resting length.

In order to know the effect of a muscle upon a joint it is necessary to know which aspect of the joint the muscle passes: anterior or posterior, superior or inferior, medial or lateral. In a joint permitting rotation, the point of attachment and "direction of pull"¹⁶ should be known. Flexion and extension or abduction and adduction are also rotatory motions. In other words: "the joint represents the hub of a wheel, the part moved is a spoke which makes only a partial revolution" (32:37).

Measurement of muscle weakness. Muscle movements differ greatly in freedom, force, speed, range, exactness, and fineness. All these factors are dependent upon the way in which muscles work (32:137). Muscle contraction is accompanied by an electrical discharge known as the action current. The action current is small but possible to detect and measure.

Various devices are used for measuring muscular action in a given movement. Among the most accurate of these are the oscillograph and the galvanometer.

A muscle that has no power at all is rated at zero. If there is a slight contraction but no movement of the part, it is rated as trace. A muscle rated as poor can move through the range of motion with gravity eliminated but cannot move against

¹⁶Direction of pull refers to the fact that a muscle can only pull, it never pushes.

gravity. "Patients are not often referred for occupational therapy unless the strength of the affected muscles is rated as fair" (35:211). A muscle having a fair degree of strength can move the part through the range of motion against gravity but not against gravity and resistance. A muscle rated as good can move the part against gravity and some resistance, depending upon the strength of the muscle.

Precautions in the treatment of muscle weakness. In order to strengthen muscles, overfatigue should be kept to a minimum; however, a muscle should be tired by exercise if it is to become stronger. Exercise against resistance is required if all fibers of a muscle are to be used. A muscle which is continuously stretched tends to lose its elasticity and could be permanently damaged. Substitution of other muscles to perform the action of affected muscles or the use of tendon action should be guarded against. This cannot be done unless the substitutions likely to occur and the muscles that perform a given motion are known.

Importance of positions for proper exercise. In the treatment of patients with muscular weakness and joint limitation, it may be necessary to place the patient in such a position that other motions cannot be substituted for the desired movement. The following positions apply to the parts of the body associated most closely with the playing of musical

instruments. Included are (35:202,203):

1. Positions for Exercise of the Fingers. When the object of the exercise is flexion of the fingers, the wrist should be slightly hyperextended. This tends to relax the tendons and gives greater finger flexion. When the object is extension of the fingers, the wrist should be slightly flexed, thereby relaxing the long flexor muscles and permitting greater extension of the fingers.
2. Positions for Exercise of the Wrist. In flexion and extension of the wrist, the elbow should be either rested on the table or held at the side to prevent the substitution of elbow motion for wrist movement.
3. Positions for Exercise of the Forearm. In pronation and supination, the elbow should be bent to 90° to prevent the substitution of internal and external rotation at the shoulder.
4. Position for Exercise of the Elbow. To obtain flexion and extension of the elbow, the arm should be held at the side to prevent compensatory motion of the back. . . the motion of the back should be eliminated by stabilization.
5. Positions for Exercise of the Shoulder. To obtain flexion and lateral abduction of the shoulder, compensatory back motions can be avoided by using a straight backed chair, or by carefully instructing the patient to hold the back rigid. Rotation of the shoulder is accomplished most easily when the arm is at an angle of 140° lateral abduction.

Musculature of the parts of the body above the waist.

Only the parts of the body above the waist relate directly to the use of musical instruments. A study of instrument playing and group muscles associated with each individual instrument will be given in Chapter V.

The study of muscle action is a very complex one. There is no arrangement patterned in the human body for the natural

contraction of a single muscle. Instead the brain and higher nerve centers control several muscles at the same time, making them work synergistically.

Appendix B lists a complete muscular analysis of all the muscles of the upper portion of the body and their relation and inter-relation to each other in movement.

IV. HISTORY OF THE INJURY

The history of the injury should include related information concerning the physical and mental condition of the child.

Date of injury. The length of time between the injury and the beginning of medical treatment is important. This is particularly true with fractures and dislocations because a delay in reduction usually affects the speed of recovery.

Cause of the injury. The cause of the injury may have bearing on the mental attitude of the child. Fear of permanent disability or fear of pain may have psychologic effect on the child.

Medical or surgical treatment. In children with fractures, information should be given regarding the method of reduction; whether open or closed, and whether traction was used prior to the application of the cast. "The length of time

the part was immobilized affect the degree and type of limitation of motion and make certain movements difficult to regain" (35:193).

V. OTHER TREATMENTS

Physical therapy.¹⁷ If the child has, or is having physical therapy, the type as well as the length of time treatment has been received should be known. When physical therapy is prescribed along with occupational therapy, the two treatments must be co-ordinated. The plan of treatment should be determined by the physician and therapist working together.

Home exercises prescribed by physician. Physicians often prescribe direction for home exercise, but the child may be inclined either to over exercise or under exercise. Undirected action and exercise may interfere with the results of occupational therapy and should be discouraged.

VI. PSYCHOLOGIC ATTITUDE

Fear of permanent disability. The child's fear of permanent disability and also pain may be so great as to prevent continuation of treatment. The child should fully understand

¹⁷Physical therapy is a method of treating disease and injury with the aid of physical agents, as a rule in conjunction with medical and surgical measures (20:13).

how to work with the therapist in receiving treatment. Cooperation is essential in reaching the end result of the highest physical function possible.

Cooperation and interest. One of the greatest assets of occupational therapy is that the rehabilitation of the diseased or injured area is accomplished with a minimum of pain for the child. Confidence in the treatment and in the therapist, as well as cooperation, are essential. If a child is convinced that the therapy received is helpful, this cannot help but expedite recovery.

VII. SOCIO-ECONOMIC STATUS, AGE, SEX, EDUCATION

This type of knowledge is helpful in selecting a proper type of therapy. Physical rehabilitation is accelerated when the child has an interest in normal activity.

VIII. PROGNOSIS

Information regarding the whole course of the disease or injury is very important. If there is doubt as to sufficient rehabilitation, the case should be considered from the point of view of vocational rehabilitation. Plans can be made whereby the occupational therapy can serve as rehabilitation and as pre-vocational training.

CHAPTER V.

THE THERAPEUTIC APPLICATION OF INSTRUMENTAL MUSIC

Assignment of patients to instrument playing should be made in the same manner as other assignments in occupational therapy. The physician should prescribe the instrument which best meets the convalescent's needs. The physician should explain to the therapist the motion desired and the precautions to be followed.

The complex co-ordination of movements found in playing a musical instrument should be analyzed for each specific application in terms of orthopedic principles. Dr. A. Flagler Fultz¹⁸ mentions that "primary variations include the position of the patient in relation to the instrument and the particular movement needed in playing it." Fultz cites cases in which music was arranged so that an affected hand could carry the melody (34:150).

Various studies have been carried on concerning the biodynamics of piano playing with movements of hand, arm, and shoulder, showing the muscles employed, giving the origin, and showing the attachment and simple function of each. Similar studies have also been made for other instruments.

¹⁸Chairman of the Department of Music Therapy at New England Conservatory of Music, Boston, Massachusetts.

Dr. Robert Summa, St. Louis Orthodontist, specialized in strengthening children's teeth by playing wind instruments. The flute was used for underdeveloped chin, a double reed for short upper lip, clarinet for receding upper arch, and for protruding upper arch the trumpet or bugle. Dr. Summa states that:

Such results are possible because of the exercise given the lungs and tongue. The exercise increases blood circulation and brings about a resultant development and bone growth (1:61).

Many instruments may be employed for purposes other than mobilization of joints and muscles. "Music as an exercise can be used not only for its effect on the joints and muscles, but to increase the use of lungs and larynx" (21:47). During the movements involved with wind instrument playing, the abdominal wall and diaphragm are contracted and relaxed in opposition to each other. This type of pumping action is necessary for diaphragm breathing. "The alternation of contraction with relaxation. . . improves the circulation of the blood and is a factor in the maintenance of good nutrition in muscle and bone tissue" (29:155). When diaphragm breathing is used, rhythm and timing are of the most importance. Through this co-ordinated movement the development of circulation and metabolism of the muscles takes place. The real essence of co-ordinated movement anywhere in the body is this interplay of contraction and relaxation in the muscles.

In Education of the Handicapped, contributor Lucille N.

Johnson, in the chapter on music and rhythmic exercise, states: "Playing some kind of musical instrument may provide for such a child [handicapped] a joy and enthusiasm which prompts such efforts as is necessary to accomplish a muscular co-ordination previously unbelievable" (17:357).

I. METHODS OF INSTRUCTION

The successful application of music therapy can only be obtained through proper instruction. The child must, at all times, know what the therapist expects so as to require a minimum of correction during the treatment.

The technical procedures used in instruction combine both telling and showing a patient what to do. The four basic steps to be followed are (1) the preparation of the patient, (2) the presenting of the activity, (3) the try-out performance, and (4) the follow-up.

The preparation of the patient. The first step must be putting the patient at ease. This may be done by talking about familiar things in a friendly and cordial manner. An understanding of the patient's psychologic reactions also helps in this phase.

The therapist must also find out what the patient knows about the activity, that is, how much background has the patient had in the playing of a musical instrument? Is the patient to be classed as a beginner, intermediate, or advanced student?

In order to be successful, the activity should be thoroughly understood by the patient. If it is not clear, the patient may lose interest and develop a hatred for instrumental music.

Presentation of the activity. While demonstrating the activity to the patient, the therapist should face in the same direction as the patient. This avoids the chance of the patient receiving a reversed mental image of what is to be done. If an activity primarily requiring the use of the right hand is being demonstrated, the patient should be on the left side so that the right hand does not hide the correct position.

The therapist should tell and show the patient how to do the activity. In the verbal instruction, the English used should be adapted to the patient's comprehension. Technical terms should be avoided or, if used, explained thoroughly. The material to be learned should be presented slowly and patiently.

Try-out performance. After the therapist has demonstrated the activity, it should be performed on a try-out basis by the patient. After the process has been tried, it should be repeated and questions asked concerning the main points of the procedure. If any errors occur, they should be corrected at once and, if possible, be anticipated and avoided. The patient should never be permitted to repeat an error because repetition fixes incorrect methods in his mind. It may be necessary for the therapist to demonstrate the activity again for the patient.

The patient should repeat the activity a third time, explaining the process in his own words. The repetitions are necessary in order to be sure the patient knows how to do the activity.

Follow-up. When the patient knows what to do, independent work may follow. The time limit set up by the physician and therapist should be followed. The patient should be checked frequently to see that work may continue and is progressing satisfactorily.

II. PREPARATION FOR INSTRUCTION

The proper instrument and necessary music and equipment should be at hand ready to use and in the proper work place. The equipment should be set up in the way it is to be used.

The posture of the patient must also be considered in the choice of music stand or chair. If the treatment is given in a ward, the patient's position in the bed or wheel chair must allow the proper breath support and correct posture.

The analysis of the process involved in a procedure is an important step in the preparation for instruction. In analyzing an activity, the process should be done slowly, noting each step.

Extension. This is the straightening of a joint as in opening the hand and fingers, straightening the wrist and elbow as in reaching, bringing the arm forward and down for the

shoulder, and coming to attention for the neck and back.

Table VI gives a break-down of the body parts and the musical instruments possible to use with each part in the movement of extension.

TABLE VI
MUSICAL INSTRUMENTS USED FOR EXTENSION

<u>Part</u>	<u>Instruments</u> ¹⁹
Thumb	Piano* Flute Clarinet (to some extent) Saxophone Bassoon
Fingers	Piano* Plectrum instruments* String instruments ²⁰ Wood-wind instruments
Wrist	Piano* Timpani* Trombone (to some extent) String instruments
Elbow	Plectrum instruments* Trombone* Percussion instruments String instruments
Shoulder	Cymbals* String instruments
Neck	Xylophone* Marimba*
Back	Bass violin*

¹⁹The instruments marked with an asterisk are best suited for the particular motion desired.

²⁰The normal playing position of many of the musical instruments may be reversed. That is, the violin may be bowed with the left hand if necessary for treatment, etc.

Flexion. This is the bending of a joint as in closing the hand and fingers, touching the inside of the forearm for the wrist, bringing the hand toward the face for the elbow, raising the arm forward and upward for the shoulder, and picking up something from the ground for the neck and back. See Table VII for the instruments used in flexion.

TABLE VII
MUSICAL INSTRUMENTS USED FOR FLEXION

<u>Part</u>	<u>Instruments</u>
Thumb	Piano* Wood-wind instruments* Trumpet (with thumb trigger) French horn (double)
Fingers	Piano* Wood-wind instruments* Trumpet French horn or Mellophone Tuba (on stand)
Wrist	Plectrum instruments* Trombone (to some extent)
Elbow	Trombone* String instruments* Snare drum (in doing flams)
Shoulder	Piano* Timpani* Trombone (to some extent)
Back	Timpani* (as in tuning) Xylophone, Marimba, etc.

Abduction. This is movement away from the body as in outward movement of the fingers or wrist with the palm and thumb out, raising the arm sidewise, or moving the arm back of the body for the shoulder. Table VIII shows the instruments adaptable with abduction.

TABLE VIII
MUSICAL INSTRUMENTS USED FOR ABDUCTION

<u>Part</u>	<u>Instruments</u>
Thumb	Piano* Castanets*
Fingers	Piano* Castanets* Bassoon (to some extent)
Wrist	Snare drum* Timpani*
Shoulder	Piano (to some extent)

Adduction. This is movement toward the body as in bringing the fingers together, inclining the hand toward the body with the palm up and thumb out for the wrist, lowering the arm sidewise, or bringing the arms across the chest for the shoulder. Instruments used for adduction are shown in Table IX.

Circumduction. This is circular swinging movement as in twirling for the thumb and fingers, revolving for the wrist, or full arm swing for the shoulder. See Table X for instruments used.

TABLE IX
MUSICAL INSTRUMENTS USED FOR ADDUCTION

<u>Part</u>	<u>Instruments</u>
Thumb	Trumpet* (with thumb trigger) Bass Trombone* (with thumb lever) French horn* (double)
Fingers	String instruments*
Wrist	Accordion (bass chord buttons) (left hand only)
Shoulder	Cymbals* Piano Accordion

TABLE X
MUSIC INSTRUMENTS USED FOR CIRCUMDUCTION

<u>Part</u>	<u>Instruments</u>
Thumb	Piano* Accordion* (key board)
Fingers	Piano* Accordion* (key board)
Wrist	Bass Drum*
Shoulder	Bass Drum*

Pronation. This is turning hand, palm down.

Supination. This is turning hand, palm up.

Table XI contains both pronation and supination and the instruments used for these motions.

TABLE XI

MUSICAL INSTRUMENTS USED FOR PRONATION AND SUPINATION

<u>Part</u>	<u>Instruments</u>
Elbow	Plectrum instruments* Snare drum*

Rotation. This is turning or twisting around an axis as in turning a doorknob with the elbow and wrist. This rotates the shoulder. Table XII shows the instruments used for rotation.

TABLE XII

MUSICAL INSTRUMENTS USED FOR ROTATION

<u>Part</u>	<u>Instruments</u>
Wrist	Snare drum*
Elbow	Snare drum*
Shoulder	Orchestral Chimes (outward rotation) Bass drum (Scotch drumming)

It is important for the therapist to consider all children from the treatment rather than from the diagnostic point of view. The neurological diagnosis determines whether or not treatment is advisable for the afflicted child. The therapist should recognize the disordered muscles as well as the normal ones since treatment deals specifically with the individual muscles. Due to the complexity of the muscle system, the therapist must remember that not one but several instruments may be necessary to adequately treat all of the affected muscles.

In dealing with patients, fifteen specific phases or modalities make up the entire treatment (9:46):

1. Massage
2. Passive motion
3. Active assisted motion
4. Active motion
5. Resisted motion
6. Conditioned motion
7. Automatic or confused motion
8. Combined motion
9. Rest
10. Relaxation
11. Motion from the relaxed position
12. Balance
13. Reciprocation

14. Reach and grasp

15. Skills

Following is a breakdown of each modality and the musical instruments that can be used in its application. Not all of the modalities will be applicable.

Passive motion is given entirely by the therapist with no help from the child. Depending on diagnosis, any of the musical instruments may be used since it is a matter of taking the child's hands or arms and putting them in the correct position on the instrument. This motion has little value therapeutically. Its importance lies in learning the correct motions desired.

Active assisted motion is given by the therapist with a small amount of help from the child. Here again, depending on the diagnosis, any of the instruments may be used.

The child capable of doing active motion is capable of maintaining a considerable amount of control throughout the body. This modality should only be administered if control can be mastered during voluntary motions, regardless of the type of handicap. The musical instruments used should be carefully chosen so as to assure control of the specific muscles being treated. When therapy has been given and some progression has been allowed, other instruments may be used to vary the type of motion desired.

"Resisted motion is a type of force put against the

desired motion causing a slowing up of the motion" (9:73). Resisted motion can be used by the therapist but may require the use of additional appliances such as braces and splints. As an example of this, if manual resistance is desired for the tricep muscle in the arm, it may be produced by pushing against the forearm while the elbow is being straightened. The resistance put on the triceps muscle will slow up the motion. In special cases the tension on flute, clarinet, and saxophone springs could be adjusted to give more resistance. Valve spring tension could be increased and trombone slides could be treated with a heavier weight of oil. In using the percussion instruments, braces, splints and specially constructed equipment may be needed to add the correct amount of resistance. Additional equipment may consist of specially constructed chairs, body braces, and extension cuffs. Extension cuffs are constructed from corrugated paper reinforced by screening with the edges bound by adhesive tape and applied by molding around the part to be held in extension by an ACE bandage. Balance arm slings and elbow and hand splints may also be used.

When the child has advanced enough in the treatment to warrant the action of combined motion, the therapist should teach only those motions that will prove worthwhile to the individual. A combined motion such as a finger flexion with wrist extension can be accomplished but has no aim since no musical instruments call for this motion combination.

The following table lists some of the combined motions possible with musical instruments:

TABLE XIII

MUSICAL INSTRUMENTS USED FOR COMBINED MOTIONS

Finger extension combined with wrist extension

Instruments

Piano
Trombone

Elbow flexion combined with supination (forearm)

Instruments

Plectrum instruments (as in strumming)

Elbow extension combined with pronation (forearm)

Instruments

Timpani
Trombone (to some extent)
String instruments (to some extent)
Plectrum instruments (as in strumming)

Wrist flexion combined with finger extension

Instruments

Piano
Trombone
Plectrum instruments (omit the use of a pick and strum only with the fingers)

Finger extension combined with pronation (forearm)

Instruments

Trombone (with special instruction on how to turn arm downward)

Forward flexion of shoulder combined with elbow extension

Instruments

Timpani
Trombone
String instruments (to some extent)

"The purpose of relaxation is to do away with certain activities that place an undue tax upon the organism" (16:420). The modality of relaxation can be applied to musical instruments only through the breathing and tonguing necessary in wind instrument playing. As stated previously, when breathing, the abdominal wall and diaphragm are contracted and relaxed in opposition to each other. The Kinesiology of Corrective Exercise stated that:

During forced inspiration fixation of the spinal column is needed, a fact which is demonstrated by the natural tendency of the individual making such efforts to hold more or less rigid the lumbar and cervical regions as well as the shoulder girdle, humerus and head. This rigidity of the spine and shoulder girdle is important for the powerful efforts of forced inspiration since it provides steadiness of the bones which constitute the origins of the diaphragm and many of the muscles which elevate and evert the ribs (14:63).

A further explanation of diaphragm breathing says:

Simultaneous contraction of the intercostals and diaphragm expands the chest in all directions and thus produces inhalation. . . . When the muscles of inhalation relax the air is expelled by the elasticity of the lungs, the weight of the chest, and by the elasticity of the abdominal wall, the latter forcing the diaphragm up to its resting position (2:243,244).

Although the periods of relaxation between breaths are only for a short duration, special breathing exercises may be worked out such as whole notes alternating with whole rests.

The extension and retraction of the tongue, as well as its elevation and depression are all present in wind instrument playing. The correct placement of the tongue in relationship to the mouthpiece is a subject of much controversy and will

not be dealt with.

Owing to the fact that the tip, sides, upper surface, and part of the lower surface of the tongue are free, there are only a few muscles with which to be concerned. The under surface of the tongue is fixed to the lower surface of the jaw by the geniohyoglossi muscles. The substance of the tongue consists of numerous intrinsic muscles named superior and inferior longitudinal and transverse. The tongue normally is tense when playing notes; however, when playing a whole note it is tense only for the initial attack then it falls back to a semi-relaxed position. Tonguing exercises may be employed using published material or special exercises may be written depending somewhat on the type of disorder being treated.

The main purpose of reach and grasp is to teach the patient to use his hands and fingers for the act of grasping and releasing. The elbow and shoulder muscles are also brought into play with these motions. Particularly in the use of the percussion instruments are the elbow and shoulder muscles used to great extent. Reach and grasp are necessary for the wind instruments even though the therapist may have to help the patient lift or otherwise get the instrument into the proper playing position.

The training of skills, the final step in the treatment, is taught when joint motion in an extremity can be performed with ease and control. A skill is defined as an ordinary

activity which the handicapped child must learn. In dealing with the musical instruments, a skill will be the learning of an instrument to the degree of being able to perform on the instrument.

To some extent, all musical instruments require the use of the fingers, hands, arms, and shoulders. The instruments recommended were chosen only for a specific joint motion or muscle movement. Because of the complex arrangement of the joints and muscles, the therapist must remember that many of the motions can be accomplished through the use of musical instruments other than those specifically recommended.

CHAPTER VI

TECHNIQUE AND RESULTS OF THE QUESTIONNAIRE

I. TECHNIQUE

The questionnaire was compiled and a letter explaining its purpose was sent to the administrator of each hospital contained in Appendix C. Hospitals were contacted in all of the states with the exception of Alaska, Delaware, Idaho, Kansas, Mississippi, Nevada, New Hampshire, New Mexico, and Wyoming. In the Journal of the American Hospital Association listings, no orthopedic hospitals were found in these states. All the other states were contacted in order to cover thoroughly the extent of music activities in orthopedic hospitals in as many sections of the United States as possible. The State of Washington was omitted purposely since no information was found concerning music activity of any kind with the exception of hospitals for the mentally ill.

The questions covered general information concerning the music program and specific information concerning the use of instrumental music and its relationship to the orthopedically handicapped child.

The questionnaire is valuable in showing the growth of interest in using instrumental music in rehabilitation and in provoking inquiry as to its potential for functional therapy.

II. RESULTS OF THE QUESTIONNAIRE

One hundred four questionnaires were sent to orthopedic and children's hospitals throughout the United States. Of this number, sixty-nine per cent were returned. Of the sixty-nine per cent return, fifty-three of the hospital administrators checked No under item I. A.: Do you have a music activity program in your hospital?

Of those answering No, eighty-seven per cent had no personal comments to make under item V. of the questionnaire. Thirteen per cent answered No but made additional comments regarding the music therapy program. These hospital administrators stated the following:

Record players in recreational therapy by volunteer only.

We do not believe music therapy is beneficial for cerebral palsied as a teaching or training device except in special instances as with rigidities where speed of motion is the aim, or in conditioning exercises where singing rhymes are used. Rhythm bands are used occasionally in class room or in O.T. (occupational therapy) as a motivating factor to get children moving their arms.

Good idea for functional musical activities and would like to get a program going sometime in the future.

Our work is becoming more and more short term corrective surgery and does not lend itself to long term projects such as instrumental music therapy.

We presently have two staff people with strong music backgrounds. One, an elementary school music teacher, the other with an M.A. in music. However, due to rapid turnover in this setting, neither of these people feel that a true music program can be developed.

I have only observed the music therapy field with psychiatric patients and children and I do feel that it is most beneficial with these.

Music as a recreation has had a continual place in our program which is led by trained nursery school teachers. We do not have many opportunities for the use of music in the sense of occupational therapy. The role of rhythm is recognized and used.

Twenty-six per cent of the hospital administrators completed, at least in part, the questionnaire. Following is a complete tabulation of the results:

I. A. Do you have a music activity program in your hospital?

Yes 19 No 53

B. If yes, how long has the music program been functioning in your hospital?

Answered 13 Unanswered 6 Average 6½ years

II. A. Are there instrumental activities included in your music program?

Yes 17 No 1 Unanswered 1

1. If yes, what instrumental activities are included in your music program?

3	Accordion
4	Harmonica
3	Harmonium and hand organ
3	Instrumental ensembles
3	Percussion instruments
4	Plectrum instruments
10	Piano

- 12 Rhythm orchestra: song flute, toy bells, etc.
- 3 String instruments: violin, cello, etc.
- 4 Brass instruments: trumpet, trombone, etc.
- 3 Wood-wind instruments: flute, clarinet, etc.

Other:

Guitar-Zither

Saxophone

Organ

Records

Anything which fits the needs of a particular patient

Glockenspiel-Marimba-Xylophone-Resonator bells

I use violin in upper extremity amputees for prosthesis training, the bow being held in the prosthetic hook.

B. Is instrumental music used as functional occupational therapy?

Yes 6 No 10 Unanswered 3

1. If yes, does there appear to be beneficial results through the use of instrumental music?

Yes 10 No 2 Unanswered 7

2. In what general physical conditions is functional therapy, with musical instruments, most beneficial?

- 4 Acquired deformities
- 3 Amputations
- 7 Congenital deformities
- 0 Infections
- 0 Neoplasms

9 Paralysis

2 Trauma

Other:

Inco-ordination as a result of cerebral palsy

Congenital weakness

Acquired weakness

Associated defects (hearing, sight)

Cerebral Palsy, mentioned 6 times

Polio

Arthritis

Traumatic spinal lesions

3. In what specific physical conditions is functional therapy, with musical instruments, most beneficial?

10 Co-ordination of movement Unanswered 5

5 Joint mobility

8 Muscle strength

Other:

Breathing, chest muscles, etc.

Hearing perception

Eye perception, sight, etc.

4. Is there any noticeable improvement in the psychological attitude of the patient from the use of instrumental music?

Yes 12 No 2 Unanswered 5

a) If yes, what are the indications?

Patient works with better co-ordination and more consistency.

Value appears to come from being allowed to take part in activities which others of similar age are engaged in.

More cheerful attitude.

For their own enjoyment.

More interest in therapy treatment - sense of accomplishment - better motivation.

Happier

Gives the child a feeling of accomplishment to help balance the frustration he has.

Without exception, patients referred to music therapy are more amenable to treatment in other areas (physical therapy, etc.)

Free expression of patient and a sense of accomplishment.

Increased creativity.

Better behavior.

C. When musical instruments are used, what is the procedure in working with patients?

9 Individual work Unanswered 6

7 Group work with homogeneous instruments

8 Group work with heterogeneous instruments

Other: No comments

1. What procedure appears to be most beneficial to the patient?

Which patient?

Individual work unless the patient has a need of group contact.

Individual

Alternate instrumental and vocal.

Individual work for functional therapy.
Group work for diversional therapy.

We feel that the music sessions are therapeutic but we do not aim toward any results. The child chooses his own instrument, if he doesn't want to play that is accepted.

Group-in band

Depends on results desired - whether for socialization or for specific muscle re-education.

No noticeable difference.

Group work - after playing pattern has been established.

D. If instrumental music therapy is employed, who actually does the teaching or works with the patient?

- 0 Administrator
- 1 Band Director
- 2 Occupational Therapist
- 4 Music Therapist
- 3 Specialist on particular instrument
 - 1 Wood-wind
 - 0 Brass
 - 1 Percussion
 - 3 Piano
 - 1 Voice
 - 0 Strings
 - Other:

Music instructor-teacher

Volunteer

1. What are the minimum qualifications of the teacher?

a) Education Unanswered 11

5 High School graduate (music background)

0 Elementary education minor

0 College graduate, music education minor

1 Bachelor's Degree, music major

2 Degree, music education major

0 Master's Degree in music

0 Graduate Therapist

Other:

Certified Nursery school teacher

Volunteer and teacher with music background

b) Experience necessary

At least a course or two in special education or perhaps experience in working with handicapped children.

Six month internship in mental hospital.

A degree in music therapy plus two years training in physical therapy.

Long experience in conducting bands.

2. Is the teacher employed part time or full time?

part time 3 full time 4 Unanswered 12

3. How many hours per day and per week?

per day 6 (average) per week 16 (average)

4. What is the salary range?

per hour \$1.25 to \$2.00 per month \$432 to \$500
 per week Unanswered per year \$6,240 to \$7,590

E. What room facilities are used for the instrumental music program?

5 Auditorium Unanswered 6
 0 Cafeteria
 0 Gymnasium
 0 Practice rooms
 4 Special music room
 4 Ward area

Other:

School room

Recreation room

Nursery school room

Day room

F. Is a special budget established for instrumental equipment?

Yes 2 No 11 Unanswered 6

1. If yes, how much?

Determined by need

G. Is a special budget established for other instrumental equipment?

Yes 0 No 11 Unanswered 8

III. A. By whom is the music program administered?

2 Musicians

1 Music student

- 0 Band Director
- 2 School Principal
- 1 Attendants
- 0 Red Cross Volunteer
- 0 Rehabilitation Director
- 2 Occupational Therapist
- 2 Music Therapist

Other:

School teacher (mentioned two times)

Volunteer (mentioned two times)

1. Under which department is the music program administered?

- 2 Occupational Therapy Department Unanswered 4
- 2 Music Therapy Department
- 5 Recreation Department
- 5 Education Department
- 1 Rehabilitation Department

Other:

Nursing Department

- B. What are the duties of the music administrator?

- 4 Organization and supervision of music and allied activities
- 6 Practical work with individual cases and group work.
- 4 Consultation service on music materials, equipment, programs, schedules and curricula.
- 3 Demonstration of methods.

- 2 Consultation correspondence with institutional administrators and workers.
- 5 Planning, advising and rehearsing of institutional ceremonies, festivals and programs.

Other:

Parent counseling Unanswered 9

Practice teaching

IV. A. What is included in your program of music activities?

- 6 Amateur programs Unanswered 4
- 5 Band or orchestra
- 5 Chorus work
- 0 Conducting
- 2 Dancing activities
- 1 Ear-training, theory and harmony
- 4 Individual music lessons
- 3 Motion pictures
- 1 Music composition
- 1 Music history
- 6 Passive participation-listening
- 11 Phonograph records
- 6 Radios
- 6 Tape recorder
- 5 Television
- 5 Variety programs
- 8 Visiting artists and groups

Other:

Rhythm instruments

Rhythm activities

Recreation and rehabilitation

Wheel chair square dancing

Structural programs, demonstrations

B. How many people are employed for music work?

Four hospitals listed one person employed.

Three hospitals listed none employed.

Unanswered 12

V. Personal comment. Will you please make suggestions for improving your instrumental music program and express your reactions concerning the instrumental music therapy field?

Under this item, only nine of the administrators made remarks of any kind. Ten neglected to answer this question.

The following comments were given by hospital administrators:

The primary purpose of the music therapy program is the use of musical equipment in functional therapy. The activity must be set up and carried out with the aim of alleviating the patient's disability.

Since our hospital has an extensive Cerebral Palsy program together with state wide clinical evaluation, I have done extensive group work with harmonica, chromatic bells and auto harp for co-ordination (hand to mouth training, control of drooling, etc.).

More instruments as children seem to enjoy it very much and there is a definite change in their attitude.

A special trained person in the music field is needed. More musical equipment.

It seems music therapy could make a valuable contribution

in many institutions especially in convalescing and chronic type institutions.

Music is definitely beneficial and desirable but shouldn't be forced on the patient. It should be a pleasure not a chore.

Rhythm instrument activities are a place where the most involved child can participate. The teacher feels that this gives the child a feeling of accomplishment to help balance the frustration he has.

Instrumental music therapy is valuable. This institution needs a special budget set up for such a program.

We would like to spend more time with music and rhythm band instruments, singing, action songs and body movements. I do not want a musical therapy program for I strongly believe that this has become too highly specialized and technical. All the freedom of expression is tampered with when you hope for specific results from your patients.

Contained in Appendix D are additional comments and correspondence from hospital administrators who felt the questionnaire to be invaluable in describing their particular situation with regard to the music program.

CHAPTER VII.

SUMMARY AND CONCLUSIONS

I. SUMMARY

The purpose of this study was to develop a program of functional therapy by using musical instruments as an aid in the rehabilitation of the orthopedically handicapped child. A history of both musical and occupational therapy was necessary in order to understand fully the contribution both have made in the treatment of the crippled and disabled.

Using this information as a background, a proposed program was set up to control the selection of children in the application of instrumental music as functional therapy. The main purpose of the paper was to offer concentrated activity for the rehabilitation of joint and muscle injury and to improve co-ordination. Further, the program aimed to offer diversional activity while the patient is undergoing treatment, to overcome fears and develop confidence through performance, and to encourage normal development in spite of physical handicaps.

A questionnaire was used to determine the value and extent of instrumental music in orthopedic and children's hospitals throughout the United States and to substantiate or nullify the writer's assumption that a program of functional therapy would be beneficial to the orthopedically handicapped. (See Appendix F).

II. CONCLUSIONS

Chapter VI brought out that fifty-three hospital administrators checked No under item I.A. of the questionnaire. This means that seventy-four per cent of those answering the questionnaire have not used any type of music activity in their hospitals. It will be necessary to use the remaining twenty-six per cent of those answering as the basis of proving the value of instrumental music in functional therapy.

The use of functional music in hospitals is a comparatively recent development, coming as a result of music therapy used in mental hospitals. Instrumental music activities have been primarily limited to the use of piano and rhythm instruments. Some hospitals have experimented with others, particularly the plectrum and percussion instruments. Harmonica, autoharp, and the Deagen chromatic tone bars are used very effectively in the Gillette State Hospital for Crippled Children at St. Paul, Minnesota.

Instrumental music as functional occupational therapy is used only in six out of ten hospitals answering. Ten of the hospitals, however, reported definitely beneficial results from the use of instrumental music particularly in cases of paralysis, polio, cerebral palsy, and various congenital deformities. In specific physical conditions, functional therapy has proven beneficial for co-ordination of movement, aid in swallowing,

practice in exhaling and inhaling or abdominal breathing, and in eye or sight perception.

A program of functional therapy on the psychological level can attract attention and increase the learning span. It can stimulate association and imagery and build up the ego by providing emotional release in a socially accepted way. Music may make certain withdrawn patients accessible for treatment who can be reached in no other manner.

Procedure in working with patients is somewhat varied since most hospitals have their patients for a short time only. The preference is for individual work with the patient. In group work with unlike instruments, particularly when participating in muscular action to rhythm, the most anti-social person can be enticed into cooperation. Movement and rhythm prove irresistible. Thus, music can create rapport between the patient and therapist or the teacher and pupil.

With regard to the teacher or person who works with the patient, it is clear that there is a preference for a trained music therapist. A music instructor or volunteer with a speciality on a particular instrument, in most cases piano, is also used in some hospitals. The only qualifications this person must have are a high school diploma with some music background or experience in working with instrumental music in band or orchestra. Three hospitals want their teachers to have

some background in special education or work with the handicapped or mentally retarded children. In hospitals where a music therapist is employed, the therapist is on a full time basis with an average of six hours per day spent in working with the handicapped. The volunteer is generally employed on a part time basis and receives \$1.25 to \$2.00 per hour. A trained or registered music therapist would, of course, be on a yearly salary.

Preference is shown for generally larger rooms in working with patients. The hospital auditorium, a special room, or ward area are better suited for adequate teaching than would be an individual practice or private room. Also school room, recreation room, or day rooms were mentioned.

Most hospitals do not have a special budget set up for instrumental equipment as seen by the two out of eleven answers to this question. Hospital administrators want to have a music therapy program but are limited because of lack of funds. In ten hospitals answering this question, two each listed musician, school principal, occupational therapist, music therapist, school teacher, and volunteer. Most hospital music programs are administered under either the Education Department or the Recreation Department which may account for the undeveloped budget in these hospitals. In most cases the music administrator works in the capacity of teacher or therapist and also in an administrative capacity, doing practical work with individual

cases and work in planning, advising, and setting up institutional programs.

By far the most used of the music activities would be the phonograph and records. Others include visiting artists and groups; radio and tape recorder are also used to a great extent.

The role of rhythm and rhythm instruments was mentioned numerous times by all hospital administrators answering the questionnaire.

Generally, where programs of music therapy are used, only one person is employed to do the teaching and carry out the administration of the music program.

From the general comments made by hospital administrators, those that use music therapy are firmly convinced that it is of definite value. Seemingly all requested more instruments and the availability of specially trained persons in this field.

Considering the comments from these hospital administrators, the implications are that music therapy, specifically instrumental music therapy, is a wide open field. Much interest abounds among administrators who have been exposed to this type of program. Others, who have no program of any kind, also are showing increased interest. The inadequate budget, lack of trained personnel, and general lack of information in this area tend to discourage some administrators from a music program.

Every type of institution should explore the use of music

in rehabilitation. Many are using it in recreation, some in education, but most have not even explored its possibilities as therapy where the music therapist works under the direction of a qualified physician. Music therapy has limitless possibilities not only in hospitals or special education schools but also in the public schools. Here it would be possible to develop a follow-up program specifically designed for those children who have been exposed to music therapy in a hospital.

Educators are aware that handicapped persons have a potential contribution to make to the world and that it is a primary function of education to help the handicapped realize such potentials. Educational provisions for handicapped children are not only found in the special education schools but also in residential and day schools. Public day schools are maintained by local school districts for children with many types of disabilities. Residential schools ordinarily are administered by agencies of the state government. Hospital schools for crippled children with cerebral palsy have also been established by a number of states.

Hospital administrators have implied that there is a distinct need for trained personnel to work with handicapped children in the field of functional therapy with musical instruments. Band and orchestra directors in the public schools, with their knowledge of musical instruments, could make a real contribution to the field of music therapy. It would be necessary for therapists, hospital administrators, and school

music directors to work reciprocally with the music director or instrumental music supervisor acting as a liaison between school and hospital administration. To include the public schools in a music therapy program would greatly expand the possibilities of working with handicapped children never before reached. In this way, a completely integrated program of music could be developed, one of greater benefit to all included in its scope.

In conclusion, as a specialized form of therapy, functional music therapy is a challenging answer to the musician or teacher of music who seeks to devote his talents to the service of mankind in the persons of the suffering and the handicapped.

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APPENDICES

APPENDIX A: ARMY RECONDITIONING PROGRAM, 1944

1. Objective -- The objective of music in reconditioning is to integrate music with the four main reconditioning activities; physical training, education and orientation, occupational therapy and diversional activities.

2. Personnel

a) At least two music technicians, enlisted men of the hospital detachment, are necessary in each General Hospital. They function under the Reconditioning Education Officer.

b) The success of the program lies largely in the vision, initiative, adjustability, cooperation, willingness, and musicianship of the personnel assigned to music. Care is taken in finding the right men for this work.

3. Program

a) Participation by Surgical and Medical Patients including: music workshop, orchestra, small instruments, group singing, choir, music with calisthenics.

b) Listening by Surgical and Medical Patients including: a room for music appreciation, records, libraries, balanced recorded programs over public address system, contact with symphony orchestras, etc. (Participation is prescribed by medical officer).

4. Neuro-Psychiatric Section

a) Participation

b) Listening

5. Participation by all patients

6. Orientation Lectures

7. Library

8. Advertising of music activities to patients

9. Recreational music for persons free from medical treatment.

APPENDIX B: MUSCULAR ANALYSIS OF THE FUNDAMENTAL MOVEMENTS
OF THE MUSCLES IN THE UPPER PORTION OF THE BODY

Movement

Part

Flexion

Fingers

Principal Movers - Flexor digitorum sublimis (middle phalanges)
Flexor digitorum profundis (distal phalanges)
Lumbricales (proximal phalanges)
Flexor digiti quinti brevis (proximal phalanx
of the fifth finger)

Assistant Movers - Palmar interossei (proximal phalanges of the
second, fourth and fifth fingers)
Dorsal interossei (proximal phalanges of the
second, third and fourth fingers)
Opponens digiti quinti (fifth meta-carpal)
Abductor digiti quinti (proximal phalanx of
the fifth finger)

Neutralizers* and
Stabilizers

- Extensor carpi radialis longus and brevis
and extensor. Carpi ulnaris stabilize the
wrist during flexion of the fingers thus
neutralizing the wrist flexing tendency of the
long finger flexors.

If the middle and distal phalanges of the fingers are flexed,
but not the proximal phalanges, the extensor digitorum communis
stabilizes the proximal phalanx, and the flexor carpi ulnaris
and radialis and palmaris longus stabilizes the wrist against
the pull of the extensor digitorum communis.

If the proximal phalanges of the fingers are flexed, but not
the middle or distal phalanges, the extensor digitorum communis
stabilizes the latter two phalanges and the flexor carpi radialis
and palmaris longus stabilize the wrist against the pull of the
extensor digitorum communis.

*(These are grouped together because the muscles overlap in
functions of neutralizing and stabilizing).

MovementPart

Extension

Fingers

Principal Movers - Extensor digitorum (proximal phalanges)
 Extensor indicis proprius (proximal phalanx of index finger)
 Extensor digiti quinti proprius (proximal phalanx of fifth finger)

Assistant Movers - Lumbricalis (middle and distal phalanges)
 Palmar interossei (middle and distal phalanges of second, fourth and fifth finger)
 Dorsal interossei (middle and distal phalanges of second, fourth and fifth fingers)
 Abductor digiti quinti (middle and distal phalanges of fifth finger)

Neutralizers and Stabilizers

- Flexor carpi ulnaris, flexor carpi radialis and palmaris longus stabilize the wrist during extension of the fingers thus neutralizing the wrist extending tendency of the long finger extensors.

MovementPart

Abduction

Fingers

Principal Movers - Dorsal interossei (second and fourth fingers)
 Abductor digiti quinti (fifth finger)

Assistant Movers - Lumbricalis (index finger)

Neutralizers and Stabilizers

- Various muscles of the wrist and hand serve in these capacities depending upon the position of the hand upon which fingers are being abducted, and upon the force of movement.

MovementPart

Adduction

Fingers

Principal Movers - Palmar interossei (second, fourth and fifth fingers)

Opponens digiti quinti (fifth meta-carpal)

Assistant Movers - Lumbricalis (fourth and fifth fingers)

Neutralizers and Stabilizers and - Various muscles of the wrist and hand serve in these capacities depending upon the position of the hand, upon which fingers are being adducted, and upon the force of movement.

MovementPart

Flexion

Thumb

Principal Movers - Flexor pollicis longus (distal phalanx)

Flexor pollicis brevis (meta-carpal and proximal phalanx)

Assistant Movers - Abductor pollicis brevis (meta-carpal and proximal phalanx)

Opponens pollicis (meta-carpal)

Adductor pollicis (proximal phalanges)

Neutralizers and Stabilizers and - The extensors of the wrist and other muscles of the wrist and hand, depending upon position of the hand and the force of the movement.

<u>Movement</u>	<u>Part</u>
Extension	Thumb

Principal Movers - Extensor pollicis longus (distal and proximal phalanges)

Extensor pollicis brevis (proximal phalanx)

Assistant Movers - Adductor pollicis (meta-carpal)

Neutralizers and Stabilizers - The flexors of the wrist and other muscles of the wrist and hand, depending upon the position of the hand and the force of the movement.

<u>Movement</u>	<u>Part</u>
Abduction	Thumb

Principal Movers - Abductor pollicis longus

Assistant Movers - Extensor pollicis brevis

Abductor pollicis brevis (abducts if joint is in a flexed position)

Extensor pollicis longus (abducts if joint is in extended position)

Neutralizers and Stabilizers - The ulnar flexors of the wrist and other muscles of the wrist and hand, depending upon the position of the hand and the force of the movement.

<u>Movement</u>	<u>Part</u>
Adduction	Thumb

Principal Movers - Adductor pollicis

Opponens pollicis

Assistant Movers - Flexor pollicis brevis

Flexor pollicis longus

Neutralizers and Stabilizers - None, unless the movement is forceful in which case all of the muscles of the wrist and hand seem to be in static contraction.

MovementPart

Opposition

Thumb

Movers - Flexion and hyper-adduction
of meta-carpal bone

Flexor pollicis brevis

Adductor pollicis

Opponens pollicis

Extension of meta-carpal bone
and flexion of the phalanges

Adductor pollicis

Opponens pollicis

Flexor pollicis longus

Flexor pollicis brevis

Neutralizers - In the second part of the movement, the tendency of the flexor pollicis longus to flex and radially flex the wrist is neutralized by the extensor carpi radialis longus and extensor carpi radialis brevis.

MovementPart

Opposition

Thumb

Neutralizers - The tendency of the flexor pollicis brevis to flex the meta-carpal bone at the same time that it is flexing the first phalanx is neutralized by the extensor pollicis longus and brevis.

Stabilizers - All the muscles of the wrist contract to stabilize it, particularly when the thumb is pressing forcefully against the fingers.

MovementPart

Flexion

Wrist

Principal Movers - Flexor carpi ulnaris
 Flexor carpi radialis
 Palmaris longus

Assistant Movers - Flexor digitorum profundis (when prevented from flexing fingers)
 Flexor digitorum sublimis (when prevented from flexing fingers)
 Flexor pollicis longus
 Abudctor pollicis longus

Neutralizers - When strong wrist flexion requires the aid of the finger flexors, the finger extensors contract to counteract the effect of the finger flexors on the fingers, thus permitting them to affect only the wrist joint. Flexor carpi ulnaris is mutually neutralizing with flexor carpi radialis and abductor pollicis longus with respect to ulnar and radial flexion.

Stabilizers - When strong wrist flexion is desired, the triceps provides a firm support for the origins of the wrist flexors by preventing flexing at the elbows.

MovementPart

Extension

Wrist

Principal Movers - Extensor carpi radialis longus
 Extensor carpi radialis brevis
 Extensor carpi ulnaris

Assistant Movers - Extensor communis digitorum
 Extensor pollicis longus

MovementPart

Extension

Wrist

Neutralizers - When strong wrist extension requires the aid of the finger extensors the finger flexors contract to prevent extension of the fingers. Extensor carpi radialis longus and brevis and extensor carpi ulnaris are mutually neutralizing with respect to radial and ulnar flexion.

Stabilizers - When strong wrist extension is desired the triceps provides a firm support for the origins of the wrist extensors by preventing flexion at the elbow.

MovementPart

Radial Flexion*
(Abduction)

Wrist

Principal Movers - Extensor carpi radialis longus

Extensor carpi radialis brevis

Flexor carpi radialis

Assistant Movers - Abductor pollicis longus

Extensor pollicis longus

Extensor pollicis brevis

Flexor pollicis longus

Neutralizers - Extensor carpi radialis longus and brevis and flexor carpi radialis are mutually neutralizing with respect to one another's extension and flexion tendencies.

Stabilizers - Biceps steadies the elbow joint. Abductor pollicis longus is prevented from abducting and extending the thumb by the stabilizing action of the thumb flexors and adductors.

*In place of abduction and adduction, the movements are radial and ulnar flexion of the wrist (36:234,235).

<u>Movement</u>	<u>Part</u>
Ulnar Flexion (Adduction)	Wrist

Movers - Extensor carpi ulnaris

Flexor carpi ulnaris

Neutralizers - Extensor carpi ulnaris and flexor carpi ulnaris are mutually neutralizing with respect to extension and flexion.

Stabilizers - Triceps provides a firm base of support for the ulnar flexors by preventing flexion at the elbow. Palmar interossei prevent abduction of little finger by ulnar flexors.

<u>Movement</u>	<u>Part</u>
Flexion	Elbow

Principal Movers - Biceps

Brachialis

Brachioradialis

Assistant Movers - Pronator teres, flexors of the hand and fingers (probably unimportant as forearm flexors)

Neutralizers - The pronator teres and the biceps are mutually neutralizing with respect to pronation and supination of the forearm. The pronator quadratus helps to counteract the supinatory function of the biceps when flexion is resisted or when flexion is performed with the forearm in a pronated position.

Stabilizers - If not prevented from so doing, flexion of the forearm will cause slight hyperextension of the arm at the shoulder joint, especially if a weight is held in the hand. If this is not desired, the pectoralis major, anterior deltoid and

coraco-brachialis will counteract to stabilize the humerus. In many instances, as in pulling, the cooperative action of the forearm flexors and upper arm extensors is necessary. In such cases the humerus will not need to be stabilized but it will require the stabilization of the scapula of the trunk itself.

<u>Movement</u>	<u>Part</u>
Extension	Elbow

Principal Movers - Triceps

Assistant Movers - Anconeus

Neutralizers - none

Stabilizers (When forearm is extended forcefully) - Pectoralis major, sternal portion

Latissimus dorsi

Teres major

<u>Movement</u>	<u>Part</u>
Pronation	Elbow

Principal Movers - Pronator quadratus

Pronator teres

Assistant Movers - Anconeus

Brachioradialis (reduction of supination to neutral position)

Neutralizers - The triceps and anconeus counteract the flexion tendency of the pronator teres.

Stabilizers - The counteraction of the triceps, anconeus and pronator teres serves to stabilize the elbow joint.

<u>Movement</u>	<u>Part</u>
Supination	Elbow

Principal Movers - Supinator

Biceps

Assistant Movers - Brachioradialis (reduction of pronation to neutral position)

Neutralizers - If flexion is not desired, the triceps and anconeus counteract the flexion tendency of the biceps.

Stabilizers - The counteraction of the triceps, anconeus and biceps serves to stabilize the elbow joint.

<u>Movement</u>	<u>Part</u>
Abduction	Shoulder

Principal Movers - Middle deltoid

Supraspinatus

Assistant Movers - Long head of biceps, especially if the movement is resisted.

Anterior deltoid, after the arm passes above the horizontal.

Clavicular portion of the pectoralis major, after the arm passes above the horizontal.

Neutralizers - The infraspinatus and teres minor neutralize the flexion tendencies of the anterior deltoid and upper pectoralis major after the arm passes the horizontal.

Stabilizers - Trapezius
Sub clavis

<u>Movement</u>	<u>Part</u>
Adduction	Shoulder

Principal Movers - Latissimus dorsi

Teres major

Pectoralis major, sternal portion

Assistant Movers - Posterior deltoid

Coracobrachialis, when arm is above the horizontal.

Short head of biceps, when arm is above the horizontal.

Long head of triceps, if elbow is in flexed position.

Neutralizers - The anterior and posterior muscles neutralize one another's flexion and hyperextension tendencies.

Stabilizers - The coracobrachialis, the short head of the biceps, and the long head of the triceps are all shoulder stabilizers as well as movers. They each have a relatively large non-rotary or stabilizing component of force pulling lengthwise through the humerus toward the glenoid fossa. The rhomboids stabilize the scapula. The abdominal muscles and spinal extensors stabilize the trunk if the adduction is forceful.

<u>Movement</u>	<u>Part</u>
Flexion	Shoulder

Principal Movers - Anterior deltoid

Pectoralis major, clavicular portion.

Assistant Movers - Coracobrachialis

Short head of biceps, especially if elbow is in extended position.

Neutralizers - The infraspinatus and teres minor neutralize the inward rotatory component of the anterior deltoid and pectoralis major.

Stabilizers - Trapezius
Sub clavis

<u>Movement</u>	<u>Part</u>
Extension	Shoulder

Principal Movers - Latissimus dorsi, especially during the lower 60° of motion.

Pectoralis major, sternal portion, diminishing as the movement progresses.

Teres major

Assistant Movers - Posterior deltoid

Long head of triceps, especially if elbow is in flexed position.

Neutralizers - The posterior deltoid neutralizes the inward rotatory tendency of the pectoralis major. If the movement is performed with force the infraspinatus and teres minor also contract to prevent inward rotation.

Stabilizers - The long head of the triceps and the coracobrachialis stabilize the shoulder joint; the rhomboids stabilize the scapula; the abdominal muscles and internal intercostals stabilize the ribs; and the sacrospinalis stabilizes the spine. The degree to which these muscles contract depends upon the forcefulness of the act.

MovementPart

Outward Rotation

Shoulder

Principal Movers - Infraspinatus and teres minorAssistant Movers - Posterior deltoid, when the humerus is adducted and extended.Neutralizers - noneStabilizers - The middle trapezius and rhomboids stabilize the scapulae.MovementPart

Inward Rotation

Shoulder

Principal Movers - Subscapularis

Teres major

Assistant Movers - Latissimus dorsi

Anterior deltoid

Pectoralis major, clavicular portion.

Coracobrachialis (helps to reduce outward rotation)

Short head of biceps (helps to reduce outward rotation)

<u>Movement</u>	<u>Part</u>
Abduction	Shoulder Girdle

Movers - Serratus anterior

Pectoralis minor

Neutralizers - The serratus anterior and pectoralis minor mutually neutralize one another's tendency to rotate the scapula.

Stabilizers - The abdominal muscles and possibly the internal intercostals stabilize the ribs if the movement is forceful. The levator scapulae help to support the scapula.

<u>Movement</u>	<u>Part</u>
Adduction	Shoulder Girdle

Principal Movers - Rhomboids

Middle trapezius, part III

Assistant Movers - Lower trapezius, part IV

Neutralizers - The rhomboids and lower trapezius are mutually neutralizing with respect to elevation and depression of the scapula, also with respect to downward and upper rotation.

Stabilizers - The abdominal muscles and the sacrospinalis stabilize the spine. This is particularly true if the movement is performed unilaterally because of the tendency of the spine to rotate.

MovementPart

Flexion

Thoracic and Lumbar Spine

Principal Movers - Rectus abdominis

External oblique abdominal muscle

Internal oblique abdominal muscle

Assistant Movers - Psoas major and minorNeutralizers - The muscles of the left and right side neutralize one another's lateral flexion and rotational tendencies.Stabilizers - Hip flexors, particularly when movement is performed in supine position.MovementPart

Extension

Thoracic and Lumbar Spine

Principal Movers - Sacrospinalis, thoracic and lumbar portions

Semispinalis dorsi

Spinalis dorsi

Assistant Movers - Deep posterior spinal muscles.Neutralizers - The muscles of the left and right side neutralize one another's lateral motions.Stabilizers - Hip extensors, particularly when the movement is performed in the prone position.

MovementPart

Rotation

Thoracic and Lumbar Spine

Principal Movers - External oblique abdominal muscle

Semispinalis dorsi

Multifidus

Levatores costarum

Assistant Movers - Sacrospinalis, thoracic and lumbar portions particularly the ibocostalis dorsi.

Internal oblique abdominal muscle

Neutralizers - The anterior and posterior muscles neutralize one another's flexion and extension tendencies. The muscle on the opposite sided neutralize one another's lateral flexion tendencies.Stabilizers - The oblique abdominal muscles serve to stabilize the pelvis for the sacrospinalis and multifidus and vice versa.MovementPart

Respiration

Thorax

Muscles of normal inhalation - Diaphragm

External intercostals

Internal intercostals, anterior cartilaginous region

Additional muscles of vigorous inhalation - Sternocleidomastoid

The three scalm

Levatores costarum

Serratus posterior superior

Pectoralis minor

Trapezius I

<u>Movement</u>	<u>Part</u>
Respiration	Thorax

Additional muscles of vigorous inhalation - Levator scapulae
 The thorac spine
 extensors

Muscles of vigorous exhalation - Internal intercostals, posterior
 and lateral portions
 Transversalis
 Rectus abdominus
 Oblique abdominal muscle
 Transversus thoracis
 Serratus posterior inferior

<u>Movement</u>	<u>Part</u>
Flexion	Head and Trunk

Principal Movers - Sternocleidomastoid
 Longus capitas and colli
 Rectus capitas anterior

Assistant Movers - Three scaleni
 Suprahoids
 Infrahoids
 Rectus capitis lateralis

Neutralizers - The muscles on two sides neutralize one another's lateral motion.

Stabilizers - Sub clavus (stabilize the clavical for sterna-
 cleidomastoid)

MovementPart

Flexion

Head and Trunk

Stabilizers - Lower cervical and upper thoracic extensors
(stabilize the spine for longus capitis and colli,
rectus capitis anterior and lateralis, and the
three scalini)

Rectus abdominus (stabilize the sternum for the
sternocleidomastoid)

MovementPartExtension and
Hyperextension

Head and Trunk

Principal Movers - Splenius cervicis and capitis

Sacrospinalis, cervicis and capitis portions.

Semispinalis, cervicis and capitis portions.

The suboccipitals

The deep posterior spinal muscles, cervicis
and capitis portions.

Assistant Movers - Trapezius I

Neutralizers - The muscles on two sides neutralize one another's
lateral motion.

Stabilizers - Extensors of the thorac and lumbar spine.

Rhomboid and trapexius IV (stabilize the scapula
for trapezius I)

MovementPart

Rotation

Head and Trunk

Principal Movers - Sternocleidomastoid

Multifidus, cervicis portion.

Assistant Movers - Splenius, capitis and cervicis

Sacrospinalis, capitis and cervicis portions.

Suboccipitals

Neutralizers - The anterior and posterior muscles neutralize one another's flexion and extension tendencies.Stabilizers - Flexors and extensors of the thoracic and lumbar spine. Sub clavus (stabilize the clavical for the sternocleidomastoid). (37:Chs. 8,9,10,11,12).MovementPartFlexion, Extension
and Rotation

Neck

Lateral Vertebral Muscles - The scalenus anterioris and medius raise the first rib; bend and slightly rotate the neck. The scalenus posterior raises the second rib; bends and slightly rotates the neck.Group Action - When the scaleni act from above, they elevate the first and second ribs, and are, therefore inspiratory muscles. Acting from below, they bend the vertebral column to one or other side; if the muscles of both sides act the vertebral column is slightly flexed.

MovementPart

Flexion, Extension
and Rotation

Neck

Anterior Vertebral Muscles - The longus colli flexes the neck and slightly rotates the cervical portion of the vertebral column. The longus capitis flexes the head. The rectus capitis lateralis bends the head laterally.

Group Action - The longus capitis and rectus anterior are the direct antagonists of the muscles of the back of the neck, serving to restore the head to its natural position after it has been drawn backward. These muscles also flex the head, and from their obliquity, rotate it, so as to turn the face to one or the other side. The rectus lateralis, acting on one side, bends the head laterally. The trapezius and sternocleidomastoid muscles of one side bends the cervical vertebral column laterally, drawing the head toward the shoulder of the side, and at the same time rotates it, pointing the chin upward and to the opposite side. Both muscles acting together flex the vertebral column bringing the head forward and at the same time elevating the chin (11:426-438).

MovementPart

Deglutition
(swallowing)

Throat

The digastricus raises the hyoid bone; assists in opening the jaws. The anterior belly draws the hyoid forward, the posterior backward. The stylohyoideus draws the hyoid bone upward and backward. The mylohyoideus muscle raises the hyoid bone and tongue. The geniohyoideus muscle draws the hyoid bone and tongue forward. The sternohyoideus draws the hyoid bone downward. The sternothyroideus draws the thyroid cartilage downward. The thyrohyoideus draws the hyoid bone downward, or if the latter is fixed, draws the thyroid cartilage upward. The omohyoideus draws the hyoid bone downward.

MovementPart

Deglutition
(Swallowing)

Throat

Group Action - The infrahyoids depress the larynx and hyoid, after they have been drawn up with the pharynx in the act of deglutition. The omohyoidei not only depress the hyoid bone but carry it backward, and to one or the other side. They are concerned especially in prolonged inspiratory efforts; for by rendering the lower part of the cervical fascia tense they lessen the inward suction of the soft parts which would otherwise compress the great vessels and the apices of the lungs. (11:426-438).

MovementPart

Opening and
closing of mouth

Jaw

Group Actions - The temporalis, masseter and pterygoideus medialis closes the jaws. Biting with the incisor teeth is performed by the masseter and pterygoideus medialis primarily, to some extent by the anterior portion of the temporalis. Biting or chewing with the molars calls all three into maximal action. Opening the jaws is performed primarily by the pterygoideus lateralis pulling forward on the condyle and rotating the mandible about the center of rotation near the angle. It is assisted at the beginning of the action by the myohyoideus, digastricus and geniohyoideus. When the mouth is opened against great resistance, in addition to the above, the infrahyoids act to fix the hyoid, and other suprahyoid muscles probably come into action. The platysma is practically without action unless the corners of the mouth are widely drawn back. It draws the outer part of the lower lip downward and backward widening the aperture at the corners of the mouth and assists in opening the jaws.

MovementPart

Opening and
closing of mouth

Jaw

Group Actions - The pterygoideus lateralis protrudes the jaw when accompanied by appropriate synergetic action of the closing muscles. The pterygoideus medialis assists in this action only as a synergist, along with the other closing muscles, when they prevent the rotation which opens the jaws widely. If the pterygoideus lateralis of one side acts, the corresponding side of the mandible is drawn forward while the opposite condyle remains comparatively fixed, and side to side movements, such as those occurring in the tuturition of food, take place. The mandible is retracted by the posterior fibers of the temporalis (11:425).

MovementPart

Facial expression

Mouth

The levator labii superioris is the proper elevator of the upper lip, carrying it at the same time a little forward. The levator labii superioris alaeque nasi also dilates the naris, and together with the former and the zygomaticus minor forms the nasolabial furrow which is deepened in expression of sadness. When these three muscles act in conjunction with the levator anguli oris the furrow is deepened into an expression of contempt or disdain. The zygomaticus major draws the angle of the mouth upward and backward in laughing. The risorius retracts the angle of the mouth. The depressor labii inferioris draws the lower lip directly downward as in the expression of irony. The depressor anguli oris depresses the angle of the mouth, being the antagonist of the levator anguli oris and zygomaticus major; acting with the levator, it draws the angle of the mouth medialward. The mentalis raises and protrudes the lower lip, and at the same time wrinkles the skin of the chin, expressing doubt or disdain. Platysma acts with this group, retracting and depressing the angle of the mouth.

The orbicularis oris in its ordinary action effects the direct closure of the lips; by its deep fibers, assisted by the oblique ones, it closely applies the lips to the alveolar arch. The superficial part, consisting principally of decussating fibers, brings the lips together and also protrudes them forward.

MovementPart

Facial expression

Mouth

The buccinator compresses the cheek and is, therefore, an important accessory muscle of mastication, holding the food under the immediate pressure of the teeth. When the cheeks have been distended with air, the buccinator compresses it and tend to force it out between the lips as in blowing a trumpet. (Latin buccinator, a trumpet player). 11:419-421).

MovementPartExtension, retraction,
elevation and depression

Tongue

The movements of the tongue, although numerous and complicated, may be understood by carefully considering the direction of the fibers of its muscles. Genioglossi, by means of their posterior fibres, draw the root of the tongue forward and protrude the apex from the mouth. The two muscles acting in their entirety draw the tongue downward so as to make its superior surface concave from side to side forming a channel along which fluids may pass toward the pharynx, as in sucking. The hyoglossi depress the tongue and draw down its sides. The styloglossi draw the tongue upward and backward. The glossopalatine draw the root of the tongue upward. The intrinsic muscles are mainly concerned in altering the shape of the tongue, whereby it becomes shortened, narrowed, or curved in different directions; thus the longitudinalis superior and inferior tend to shorten the tongue, but the former, in addition, turn the tip and sides upward so as to render the dorsum concave, while the latter pull the tip downward and render the dorsum convex. The transversus narrows and elongates the tongue, and the verticales flattens and broadens it. The complex arrangement of the muscular fibers of the tongue, and the various directions in which they run, give to this organ the forms necessary for the enunciation of different consonantal sounds (11:1236).

APPENDIX C: HOSPITALS CONTACTED THROUGH QUESTIONNAIRE

Alabama

Children's Hospital - Birmingham
Crippled Children's Clinic and Hospital - Birmingham

Arizona

Crippled Children's Hospital - Phoenix
Comstock Children's Hospital - Tucson

Arkansas

Arkansas Children's Hospital - Little Rock

California

Valley Children's Hospital - Fresno
California Babies and Children's Hospital - Los Angeles
Children's Hospital Society of Los Angeles - Los Angeles
Orthopedic Hospital - Los Angeles
Shriners Hospital for Crippled Children - Los Angeles
Children's Hospital of East Bay - Oakland
Children's Hospital - San Diego
Children's Hospital - San Francisco
Shriners Hospital for Crippled Children - San Francisco

Colorado

Children's Hospital - Denver

Connecticut

Newington Hospital for Crippled Children - Newington

District of Columbia

Children's Convalescent Hospital - Washington, D.C.
Children's Hospital of District of Columbia - Washington, D.C.

Florida

National Children's Cardiac Hospital - Miami
Variety Children's Hospital - Miami

Georgia

Henrietta Eggleston Hospital for Children - Atlanta

Hawaii

Kauikeolani Children's Hospital - Honolulu
Shriners Hospital for Crippled Children - Honolulu

Illinois

Bobs Roberts Memorial Hospital for Children - Chicago
Shriners Hospital for Crippled Children - Chicago
Illinois Soldiers and Sailors Children's School - Normal
Abbot Children's Center - Peoria

Indiana

Children's Hospital - Indianapolis
James Whitcomb Riley Hospital for Children - Indianapolis
Northern Indiana Children's Hospital - South Bend

Iowa

Children's Hospital - Iowa City

Kentucky

Shriners Hospital for Crippled Children - Lexington
Children's Hospital - Louisville
Kosair Crippled Children Hospital - Louisville

Louisiana

Crippled Children's Hospital - New Orleans
Shriners Hospital for Crippled Children - Shreveport

Maine

Maine Medical Center Children's Hospital - Portland

Maryland

Children's Hospital - Baltimore
James Lawrence Kernan Hospital for Crippled Children -
Baltimore
Children's Rehabilitation Institute for Cerebral Palsy -
Reisterstown

Massachusetts

Children's Hospital Medical Center - Boston
 Massachusetts Hospital School - Canton
 Shriners Hospital for Crippled Children - Springfield

Michigan

Children's Hospital of Michigan - Detroit
 Mary Free Bed Guild Children's Hospital - Grand Rapids

Minnesota

Elizabeth Kenny Institute - Minneapolis
 Shriners Hospital for Crippled Children - Minneapolis
 Children's Hospital - St. Paul
 Gillette State Hospital for Crippled Children - St. Paul

Missouri

Children's Mercy Hospital - Kansas City
 Georgia Brown Blosser Home for Crippled Children - Marshall
 St. Louis Children's Hospital - St. Louis
 Shriners Hospital for Crippled Children - St. Louis

Montana

Shodair Crippled Children's Hospital - Helena

Nebraska

Nebraska Orthopedic Hospital - Lincoln
 Children's Memorial Hospital - Omaha

New Jersey

Children's Seashore House at Atlantic City for Invalid
 Children - Atlantic City
 Hospital for Crippled Children - Newark
 Middlesex Rehabilitation and Polio Hospital - New Brunswick
 New Jersey Orthopedic Hospital - Orange
 Orthopedic Hospital and Dispensary - Trenton
 Kessler Institute for Rehabilitation - West Orange

New York

Children's Hospital of Buffalo - Buffalo
 House of St. Giles the Cripple - Garden City
 St. Charles Hospital - New York City
 Eastern New York Orthopedic Hospital School - Schenectady
 Children's Hospital Home - Utica
 New York State Rehabilitation Hospital - West Haverstraw

North Carolina

Asheville Orthopedic Hospital - Asheville
 Charlotte Rehabilitation Hospital - Charlotte
 North Carolina Cerebral Palsy Hospital - Durham
 North Carolina Orthopedic Hospital - Gastonia

North Dakota

Crippled Children's Hospital School - Jamestown

Ohio

May Day Nursery and Children's Hospital - Akron
 Children's Hospital - Cincinnati
 Convalescent Hospital for Children - Cincinnati
 Children's Hospital - Cleveland
 Children's Hospital - Columbus
 Children's Hospital of Toledo - Toledo

Oklahoma

Children's Convalescent Hospital - Bethany
 Bone and Joint Hospital - Oklahoma City
 Children's Memorial Hospital - Oklahoma City

Oregon

Shriners Hospital for Crippled Children - Portland

Pennsylvania

State Hospital for Crippled Children - Elizabethtown
 Zem Zem Hospital for Crippled Children - Erie
 D. T. Watson Home for Crippled Children - Leetsdale
 Children's Hospital of Philadelphia - Philadelphia
 St. Christopher Hospital for Children - Philadelphia
 Home for Crippled Children - Pittsburg

Rhode Island

Potter Memorial Hospital for Children - Providence

South Carolina

Shriners Hospital for Crippled Children - Greenville

South Dakota

West River Crippled Children's Hospital and Polio Center -
Hot Springs

Tennessee

F. C. Thompson Children's Hospital - Chattanooga
East Tennessee Children's Hospital - Knoxville

Texas

Crippled Children's Hospital and Medical Center -
Corpus Christi
Children's Medical Center - Dallas
Fort Worth Children's Hospital - Fort Worth
Providence Hospital - Waco

Utah

Shriners Hospital for Crippled Children - Salt Lake City

Vermont

De Goesbriand Memorial Hospital and Rehabilitation Center -
Burlington

Virginia

National Orthopedic and Rehabilitation Hospital -
Arlington
Crippled Children's Hospital - Richmond

West Virginia

Orthopedic Hospital - Huntington

Wisconsin

Milwaukee Children's Hospital - Milwaukee

APPENDIX D.

ADDITIONAL CORRESPONDENCE

VARIETY CHILDREN'S HOSPITAL
6125 Southwest Thirty First Street
Miami 55, Florida

William A. Taylor, Adm.

May 14, 1962

Mr. Donald H. Allgaier
1001 South 36 Avenue
Yakima, Washington

Dear Mr. Allgaier:

I have received your request for information regarding our use of instrumental music with the orthopedically handicapped child. Our particular circumstances would require so much clarification on the prepared questionnaire that I shall try to include answers to your questions in this letter.

There is no organized program of musical therapy at Variety Children's Hospital. Although music is one phase of our recreational program, there are not special times or days set aside specifically for music. Because we depend upon volunteer workers to carry out the recreational program, we are limited by the hours that they are able to give, as well as by the fact that there are very few with special skills in this field. We have no paid employee whose responsibilities are specifically in music.

When instruments are used, they are invariably very simple ones, such as ocarinas, harmonicas, tambourines, and toy percussion and rhythm instruments. Sometimes the children play together in small groups of five or six, but more often a volunteer will play at the bedsides of one or two children at a time because of the children's particular illnesses or lack of hospital space to work with a larger number of bedridden youngsters.

I would be reluctant to say that our "instrumental music" has been functional therapy in the academic sense of the term, although there are certainly functional assets for the child in having had the opportunity to "create," to be an active participant, and to have been able to dissipate a part of the normal accumulation of energy and enthusiasm which occurs with the hospitalized convalescent youngster.

Mr. Donald H. Allgaier
May 14, 1962
Page 2

I can visualize instances under all of the physical disabilities listed under Item B-2 in which functional therapy through the use of musical instruments might be very beneficial. It is difficult to say if there are one or two which would be "most" beneficial, however, for it would seem that the benefit would necessarily be determined by the particular child, his limitations, and the extent to which the use of his musical instrument would assume meaning for him.

With regard to Item B-3, I have found that most youngsters thoroughly enjoy musical programs -- particularly those in which they can participate actively by clapping, singing, using rhythm instruments and the like. To see a smiling, cheerful child would indicate to me that the musical session had been of value. There have been instances here in which the first social interaction of a very withdrawn youngster has come about through increasingly active participation in musical activities, merely listening at first, and later joining the group.

As mentioned earlier, our recreational program is carried out by volunteers. There are no minimum educational requirements for them, but all of our present volunteers are high school graduates and many have attended college. All recreational activity is carried out within the patient units because, at present, there is not a specific play area.

Music activities at our hospital include visiting amateur and professional performers, motion pictures, radio, television, phonograph records, singing, and solitary and group play with very simple instruments.

We have no special budget which is established specifically for instrumental equipment and materials. The toy instruments which are used are provided through the funds which support the general recreational program.

In response to your question, my immediate response to the field of instrumental music therapy is that it is a very highly specialized one with very particular applications. In home or out patient clinical situations or in a hospital setting where the patient will stay for a prolonged period -- e.g., a psychiatric institution -- I can see considerable value in the use of instrumental music therapy with certain patients. However, there are

Mr. Donald H. Allgaier
May 14, 1962
Page 3

still the factors of interest, motivation and capability, which are as much to be considered with the handicapped child as they are with the non-handicapped.

I feel that the role of the instrumental music therapist in a general pediatric hospital such as this one would be a rather limited one, unless the therapy would be geared to the attainment of more immediate goals -- i.e., to play simple instruments, to have fun. Many of our children are acutely ill and are discharged early in their convalescence. Although there are a number of youngsters who stay for longer periods of time, the average hospital stay at our hospital is 6.3 days, so that it would be impossible to consider the serious undertaking of a musical instrument. Therefore, our emphasis with regard to music will probably continue to be upon its potentialities as a source of fun and a means of ventilation, rather than upon the development of considerable skill in the field of music.

There are several immediate improvements which I should like to see with regard to a music program at our hospital. First of all, there should be more music of all kinds. I should like to see more active participation in musical activities and less of the passive "record-listening" variety. We hope eventually to have a spacious, informal play area (with a piano) which will be far enough away from the patient units so that the ill children will not be disturbed, and so that the convalescent children may join the activities as lustily and enthusiastically as they like.

We wish you success and good progress in the preparation of your thesis and hope that if we may be of further assistance to you that you will not hesitate to call upon us.

Very truly yours,

William A. Taylor, Administrator

THE CHILDREN'S HOSPITAL OF MICHIGAN

5224 St. Antoine Street

Detroit 2, Michigan

Temple 3-1000

May 17, 1962

Mr. Donald H. Allgaier
1001 South 36th Ave.
Yakima, Washington

Dear Sir:

Your questionnaire was received by the director of the hospital who forwarded it to me to answer. Since musical instruments are used only with specific problems which we try to overcome, I believe it will give you a better scope if I try to describe the situations under which musical instruments are used.

First of all, these instruments are not on the regular scale, but are manufactured by various toy companies. We use the flute with cerebral palsied children to promote speech development, improve vital capacity, improve lip control or whatever the individual case may be.

With a diagnosis of Bell's palsy, the flute, horn, or harmonica are being used, if the therapist feels that there is a value in it for the patient to promote. Some of our patients who need increased range of motion at the elbow, use the xylophone, or toy bells provide us with a possibility to teach color and number concept, or prehension in the hand.

All of the above described procedures come under the responsibilities of the registered occupational therapist, who selects the activities for the individual patient under the written prescription from the physician to work toward a specific goal.

All treatment is done on individual bases in the clinic area under the direct supervision of the therapist.

We have found that some of our patients respond very well to the above described approach.

I trust that my letter will be of some help to you in compiling your information.

Sincerely,

(Signed) (Miss) Sari Toth, O.T.R.
Director of Occupational Therapy

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HEALTH

State Hospital For Crippled Children

Elizabethtown, Pa.

June 8, 1962

Mr. Don H. Allgaier
1001 South 36th Avenue
Yakima, Washington

Dear Mr. Allgaier:

The Occupational Therapy Department of this hospital was established just two and one half years ago and so far has not used any music in its program. There is a choral group which has met three evenings a month for the past year under the leadership of a volunteer who has experience with choirs in the local community. This group is open to all interested teen-agers among our patients. Piano or other instruments are occasionally played by the patients, but there is no organized activity. This activity is directed by the Hospital Volunteer Steering Committee as part of the recreational program.

(Miss) Adaline J. Plank
Occupational Therapist

ADDENDA BY MEDICAL DIRECTOR

In addition there are frequent visits by musical groups in the area, providing variety programs, pop concerts, specialty instrumental or vocal numbers or leading in group singing in the wards. Some of these are part of the organized benevolent program of the Pennsylvania Chapter of the American Federation of Musicians.

Singing and instrumental numbers by both the patients and visiting groups in connection with our worship and religious activities provide one other musical outlet.

There is, however, no professionally guided strong musical program.

CRIPPLED CHILDREN'S GUILD

Associated With

ORTHOPAEDIC HOSPITAL

2400 South Flower Street - Los Angeles 7, California

May 22, 1962

Mr. Don H. Allgaier
1001 South 36th Avenue
Yakima, Washington

Dear Mr. Allgaier:

Thank you for including Orthopaedic Hospital in your gathering of information for your Master's Thesis concerning the development of a "Program for the Use of Instrumental Music with Orthopaedically Handicapped Children."

I wish we could be more helpful as your subject is most interesting and the study a most needed one.

Our music program at Orthopaedic Hospital is recreational in nature, the program consisting of a weekly visit to patients of a record player and library of records from which they choose the music they wish to hear. Staffed by volunteers, the program has been active since 1947. It is enjoyed by patients and volunteers alike and is educational only in introducing new music to patients.

Our Occupational Therapy Department, under the direction of Miss Florence Cromwell is considering the use of instrumental music in working with the Orthopedically handicapped and would be interested in any material available on the subject.

We are returning the questionnaire to you along with our very best wishes on the success of your work.

Sincerely,

Mrs. Cora Darfler
Volunteer Coordinator

APPENDIX E: GLOSSARY

Abudction. Movement away from the mid-line of the body or segment of the body.

- (a) Diagonal abduction. (see extension)
- (b) Horizontal abduction. Movement of the arm from front to side in horizontal plane.

Acute. Sharp. Of short and sharp causes.

Adduction. Movement of a limb toward the central axis of the body or segment of the body.

- (a) Horizontal adduction. Movement of arm from side to front in horizontal plane.
- (b) Lateral adduction. Pertaining to side motion.

Allergy. Hypersensitivity of the body cells to a specific substance which results in various types of reaction.

Amputation. The cutting off of a limb or part of a limb, or other projecting part.

- (a) Congenital amputation. Amputation produced "in utero" by pressure or other means.

Ankylosis. Stiffening or fixation of a joint.

Anomalies. Anything unusual or irregular or contrary to general rule.

Antagonist (muscle). An antagonist is a muscle which causes the opposite movement from that of the muscle acting as a mover. Thus in the movement of flexion, the flexors are the movers and the extensors are the antagonists.

Arthritis. Inflammation of a joint.

- (a) Rheumatoid arthritis. Resembling rheumatism in one or more features.

Arthrodia. Gliding joint, a joint in which the opposing surfaces are nearly planes and in which there is only a slight, gliding motion as in the articular process of the vertebrae and in most of the carpal and tarsal joints.

Arthrometer. An instrument for measuring the degree of motion in a joint, the range of mobility being registered on a dial.

Articulation. A jointing or connecting together loosely so as to allow motion between the parts.

Ataxia. A loss of power of muscular co-ordination.

Athetosis. A condition in which there is a constant succession of slow writhing involuntary movements of flexion, extension, pronation and supination of the fingers and hands.

Bi-articular. Muscles which cross two joints.

Biaxial. Movement around two axes, situated at right angles to each other.

Bone cysts. An abnormal sac containing gas, fluid, or a semi-solid material.

Cardiac. Relating to the heart.

Cardiopathic. Any disease of the heart.

(a) Acquired cardiopathic. Developed after birth.

(b) Congenital cardiopathic. Existing at birth.

Carpal. The wrist.

Carpometacarpal. Relating to both the carpus and metacarpus.

Chronic. Of long duration, a disease of slow progress and long continuance.

Circumduction. Movement of a part or segment of the body in a circular direction.

Cleft lip. A fissure in the lip.

Cleft palat. A congenital fissure in the roof of the mouth.

Club foot. Congenital deformity of the foot or feet.

Concavoconvex. Concave on the surface and convex on the opposite surface.

Condyle. The knuckle or a rounded articular surface at the extremity of a bone.

Condylloid. Resembling a knuckle.

Contractures. A permanent muscular contraction due to tonic spasms or to loss of muscular equilibrium.

Coxa-plana. Infection of the hip bone cartilage occurring in childhood.

Diarthroses. A movable joint in which opposing bones are not joined by a solid medium.

Dislocation. Displacement of any part; specifically a disturbance or disarrangement of the normal relation of the bones entering into the formation of a joint.

(a) Congenital dislocation. Born with the condition of a misplaced part or joint.

Distal (joint). Farthest from the center line, farthest from the trunk, referring to the segments of the extremities.

Elliptical. Oval shaped.

Enarthroses. A jointing where the ball is deep set in the socket.

Epilepsy. A chronic functional nervous disorder, characterized by attacks of unconsciousness or convulsions.

Extension. The act of extending a limb or body segment away from the body.

(a) Hyperextension. The bending of a joint in the direction opposite to flexion.

Flexion. Bending of a joint so as to approximate the parts it connects.

Fracture. To break, especially the breaking of a bone or cartilage.

(a) Comminuted fracture. The bone is broken into a number of small pieces.

(b) Compound fractures. One in which there is an open wound leading down to the seat of the fracture.

Ginglymus. Hinge joint, a uniaxial joint in which a broad, transversely cylindrical convexity on one bone fits into a corresponding cavity on the other, allowing for motion in one plane only as in the elbow.

Grafting. The implantation of skin or tissue or bone in a new location.

Humerous. The bone of the upper arm articulating with the scapula above and the radius of ulna below.

Joint. The place of union, usually more or less movable, between two or more bones.

Aspect of joint

- (a) Anterior. In front or in the front part.
- (b) Inferior. Lower in relationship to another structure.
- (c) Lateral. On the outer side.
- (d) Medial. Relating to the middle or center.
- (e) Posterior. Behind or after.
- (f) Superior. Above or higher in relation to another structure.

Lumbar spine. Relating to the loins or the part of the back and sides between the ribs and the pelvis.

Metabolism. Tissue change; the sum of all the physical and chemical processes by which living organized substance is produced and maintained.

Meta-carpal. The fine bones of the hand between the carpus and the phalanges.

Middle (joint). Finger joint between the distal and the proximal.

Mid-tarsal. Between the rows of tarsal bones referring to the articulations there situated.

Muscular atrophy. A wasting of the muscular tissue of a part or of the entire body.

Muscular dystrophy. Defective nourishment causing a progressive muscular atrophy in which the disease begins in the muscular terminals of the motor nerves and not in the spinal centers.

Musculature. The muscular apparatus of the body, or any part of it.

Neoplasms. A new growth or tumor.

Neutralizer (muscle). A neutralizer is a muscle which acts to prevent an undesired action of one of the movers.

Opposition (thumb only). Useful function of the thumb judged by its ability to oppose itself to the tips of the fingers without being drawn toward palm.

Ovoid. Ova form, egg shaped.

Palsy. Corrupt form of paralysis.

(a) Bell's Palsy. Facial paralysis.

(b) Cerebral Palsy. Disturbance of the motor functions due to damage to the brain, before, during, or after birth.

(c) Erb's Palsy. Paralysis of the muscles of the upper arm.

Poliomyelitis. Inflammation of the grey matter of the spinal cord.

Polyaxial. Multiaxial joint. (see enarthroses)

Pronation. To rotate the forearm in such a way that the palm of the hand faces downward.

Protraction. (see horizontal adduction)

Proximal (joint). Nearest the point of origin.

Radioulnar. Relating to both radius and ulna.

Reduction. The act of restoring to a normal position.

Refraction. The breaking again of a bone which has united, after a previous fracture, in a bad position.

Rickets. A disease occurring in young children: it is characterized by softening of the bones, enlargement of the liver and spleen, malnutrition, profuse sweating; and general tenderness of the body when touched.

Rigidity. Stiffness, inflexible.

Rotation. Turning or movement of the body around its axis.

Spasticity. A state of muscular rigidity and spasms with exaggeration of the reflexes.

Spina bifida. A limited defect in the spinal column consisting in absence of the vertebral arches through which the spinal membranes, with or without spinal cord tissue protrude.

Spinal curvature. A bending or flexure of the spine.

Spinal osteochondritis. Inflammation of the bones and cartilage of the spinal column.

Stabilizing (muscle). The muscles contract statically to steady or support some part of the body against the pull of contraction, against the pull of gravity, or against the effect of momentum and recoil in certain vigorous movements.

Statically. Any position in which an attempt is made to hold the body stationary is a static position.

Supination. The state of being supinated or turned volar (palm) side upward.

Suture. The surgical uniting of the two surfaces by means of stitches.

Synergy. Combined and correlated force; united action.

Syphilis. An infectious disease spread by inoculation through sexual intercourse.

Tendon. A fibrous cord or band of variable length serving to connect a fusiform (spindle-shaped) muscle with its bony attachment.

- Torticollis. A spasmodic contraction of the muscles of the neck, chiefly those supplied by the spinal accessory nerve.
- Traction. Drawing or pulling.
- Traumatic. Relating to or caused by a wound or injury.
- Tremors. Trembling, shaking, a disorder of the muscular tonus (tension) or loss of equilibrium.
- Trochoid. Revolving, rotating, denotes a revolving or wheel-like articulation.
- Tuberculosis. A specific disease caused by bacilla which affects almost any tissue or organ of the body, most common being the lungs and joints.
- Tumor (bone). A swelling on the bone not inflammatory in character arising from pre-existing tissue.
- Ulna. The inner and larger of the two bones of the forearm.
- Uniaxial. Having but one axis, growing chiefly in one direction.

Definitions used in the Glossary are taken from Stedman's Medical Dictionary (36), Crippled Children Manual (25), and A Handbook on Diseases of Children (39).

APPENDIX F: QUESTIONNAIRE

Yakima, Washington

Dear Sir:

The enclosed questionnaire has been prepared to gather information for a Master's Thesis concerning the development of a "Program for the Use of Instrumental Music with Orthopedically Handicapped Children."

The purposes of the study are: (1) to investigate the historical foundations of occupational and musical therapy and their contribution to conditions existing in orthopedic hospitals throughout the United States; (2) to determine the value and extent of instrumental music in occupational therapy in orthopedic hospitals in states other than Washington; and (3) to establish a workable program for the use of instrumental music as functional therapy.

Will you please assist in making this project a success by returning the enclosed questionnaire at your earliest convenience so that the results may be compiled within the next few weeks? Thank you.

Sincerely yours,

Donald H. Allgaier
1001 South 36th Avenue
Yakima, Washington

I. A. Do you have a music activity program in your hospital?

Yes _____ No _____

B. If yes, how long has the music program been functioning in your hospital?

_____ months _____ years

II. A. Are there instrumental activities included in your music program?

Yes _____ No _____

1. If yes, what instrumental activities are included in your music program?

_____ Accordion

_____ Harmonica

_____ Harmonium and hand organ

_____ Instrumental ensembles

_____ Percussion instruments

_____ Plectrum instruments

_____ Piano

_____ Rhythm orchestra: song flute, toy bells, etc.

_____ String instruments: violin, cello, etc.

_____ Brass instruments: trumpet, trombone, etc.

_____ Wood-wind instruments: flute, clarinet, etc.

Other:

B. Is instrumental music used as functional occupational therapy?

Yes _____ No _____

1. If yes, does there appear to be beneficial results through the use of instrumental music?
 Yes _____ No _____
2. In what general physical conditions is functional therapy, with musical instruments, most beneficial?
 _____ Acquired deformities
 _____ Amputations
 _____ Congenital deformities
 _____ Infections
 _____ Neoplasms
 _____ Paralysis
 _____ Trauma
 Other:
3. In what specific physical conditions is functional therapy, with musical instruments, most beneficial?
 _____ Co-ordination of movement
 _____ Joint mobility
 _____ Muscle strength
 Other:
4. Is there any noticeable improvement in the mental or psychological attitude of the patient from the use of instrumental music?
 Yes _____ No _____
 a) If yes, what are the indications?

C. When musical instruments are used, what is the procedure

in working with patients?

_____ Individual work

_____ Group work with homogeneous instruments

_____ Group work with heterogeneous instruments

Other:

1. What procedure appears to be most beneficial to the patient? (Please comment)

- D. If instrumental music therapy is employed, who actually does the teaching or works with the patient?

_____ Administrator

_____ Band Director

_____ Occupational Therapist

_____ Music Therapist

_____ Specialist on particular instrument: _____ Piano,

_____ Wood-wind, _____ Brass, _____ Percussion,

_____ Strings, _____ Voice (Please check)

Other:

1. What are the minimum qualifications of the teacher?

a) Education

_____ High School Graduate (music background)

_____ Elementary education minor

_____ College graduate, music education minor

_____ Bachelor's Degree, music major

_____ Degree, music education major

_____ Master's Degree in music

_____ Graduate Therapist

Other:

b) Experience necessary

2. Is the teacher employed part time? _____ full time? _____

3. How many hours per day? _____ per week? _____

4. What is the salary range?

_____ per hour _____ per month

_____ per week _____ per year

E. What room facilities are used for the instrumental music program?

_____ Auditorium

_____ Cafeteria

_____ Gymnasium

_____ Practice rooms

_____ Special music room

_____ Ward area

Other:

F. Is a special budget established for instrumental equipment?

Yes _____ No _____

1. If yes, how much? _____

G. Is a special budget established for other instrumental materials?

Yes _____ No _____

1. If yes, how much? _____.

III. A. By whom is the music program administered?

- _____ Musician
 _____ Music Student
 _____ Band Director
 _____ School Principal
 _____ Attendants
 _____ Red Cross Volunteer
 _____ Rehabilitation Director
 _____ Occupational Therapist
 _____ Music Therapist
 Other:

1. Under which department is the music program administered?

- _____ Occupational Therapy Department
 _____ Music Therapy Department
 _____ Recreation Department
 _____ Education Department
 _____ Rehabilitation Department
 Other:

B. What are the duties of the music administrator?

- _____ Organization and supervision of music and allied activities
 _____ Practical work with individual cases and group work

- _____ Consultation service on music materials, equipment, programs, schedules and curricula
- _____ Demonstration of methods
- _____ Consultation correspondence with institutional administrators and workers
- _____ Planning, advising, and rehearsing of institutional ceremonies, festivals and programs
- Other:

IV: A. What is included in your program of music activities?

- _____ Amateur programs
- _____ Band or orchestra
- _____ Chorus work
- _____ Conducting
- _____ Dancing activities
- _____ Ear-training, theory and harmony
- _____ Individual music lessons
- _____ Motion pictures
- _____ Music composition
- _____ Music history
- _____ Passive participation-listening
- _____ Phonographs-records
- _____ Radios
- _____ Tape Recorder
- _____ Television
- _____ Variety programs
- _____ Visiting artists or groups
- Other:

B. How many people are employed specifically for music work?

V. Personal comment. Will you please make suggestions for improving your instrumental music program and express your reactions concerning the instrumental music therapy field?